

JPRS-UEN-84-027

19 September 1984

USSR Report

ENERGY



FOREIGN BROADCAST INFORMATION SERVICE

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19 September 1984

USSR REPORT ENERGY

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OIL AND GAS

AZERBAIJAN OIL INDUSTRY TELLS ITS 1984 SOCIALIST COMMITMENTS

Baku AZERBAYDZHANSKOYE NEFTYANOYE KHOZYAYSTVO in Russian No 2, Feb 84 pp 1-6

[Article: "The 1984 Socialist Commitments of Enterprise and Organization Collectives"]

[Text] Greater speed of penetration! More oil, gas and petroleum product of high quality!

Azneft' [State Association of the Azerbaijan Oil Industry]

Guided by the decisions of the 26th CPSU Congress and the papers of the November 1982 and June and December 1983 CPSU Central Committee Plenums, the blue-collar workers, engineers, technicians and white-collar workers of the p/o [Production Association] Azneft' successfully met the plan for the third year of the 11th Five-Year Plan for recovering oil and gas and for the production of gross and realized output.

The p/o Azneft' collective, in striving by its selfless labor to make a worthy contribution towards strengthening the country's fuel and power base, and having estimated its reserves and possibilities, adopts the following socialist commitments for 1984:

1. By raising the effectiveness of work by the association's enterprises and organizations, using internal reserves and speeding up the introduction of new capacity, provide in 1984 for the following, above the plan:

| | |
|-------------------------|---------------------------|
| oil recovery | 5,000 tons |
| gas recovery | 10 million m ³ |
| realization of output | 400,000 rubles worth |
| profit for the industry | 400,000 rubles |

2. Raise the utilization coefficient of the operating well inventory to 0.960, for which purpose:

perform above the plan 250 geological-engineering measures and 80 operations that stimulate the bottom-hole area of wells; and

provide for a further rise in the quality of current maintenance and overhaul of wells, without allowing accidents and defects during the repair thereof.

3. By raising worker qualifications in drilling brigades, introducing scientific and technical achievements, observing geological-engineering instructions most strictly, and disseminating widely the experience of the workers of advanced drilling brigades, provide for:

the drilling above plan of 1,500 meters--1,000 meters of operational and 500 meters of exploratory drilling; and

completion of the construction of four wells above the established plan.

4. Raise further the efficiency and quality of geological exploration and drilling work by concentrating it in the area between the Kura and Iori rivers, bringing exploratory-drilling volume up to 30,000 meters, and by providing for an increase of commercial-category oil reserves in the Tarsdallyar area. Introduce prospecting drilling in 1985 at the Molladag, B. Palantekyan, Zapadnyy Gyurzungdag and Dzhandargyul areas with a view to giving an appraisal of the petroliferousness of the Middle Eocene sediments there.

5. By taking steps to intensify oil recovery, to improve work organization and to raise the degree of mechanization and automation of production processes, provide for:

overfulfillment of the industry's plan for labor productivity by 1.0 percent; and

reduce the prime cost of producing output by 0.5 percent.

6. Through organizational work among innovators and inventors and by raising their creative activeness, get savings of 2.95 million rubles from introducing inventions and innovators' suggestions into production.

7. By observing the strictest procedures for saving and consuming raw and other materials, fuel and electricity, surpass the 1984 norm for savings by

| | |
|-------------------------|----------------------------------------|
| electricity | 20 million kWh |
| heat energy | 5,210 gigacalories |
| boiler and furnace fuel | 1,900 tons of standard fuel equivalent |
| automotive gasoline | 170 tons |
| diesel fuel | 180 tons |
| metal | 120 tons |
| timber | 50 m ³ |
| cement | 210 tons |

8. Continue the work on using the newest achievements of scientific and technical progress in production, and, by introducing new methods for increasing formation productivity, recover an additional 1,500 tons of crude.

9. Systematically struggle to raise production sophistication by improving the upkeep of workplaces and improving the working and recreational conditions of workers.

10. In the area of protecting the environment:

cease fully the discharge of oilfield waste water into the Caspian sea;

return 470 hectares of recultivated land to its former tillers;

reduce the total amount of harmful substances discharged into the atmosphere by 200 tons; and

trap and neutralize 850 tons of harmful substances.

11. In executing the collective's plan for social development, provide for the introduction into operation of:

23,100 m² of total living space;

a hoghouse for 1,500 head of hogs at the NGDU [Oil and Gas Recovery Administration] of Karadagneft' [Karadag Oil Production Association]; and

a cow barn for 200 head of cattle at the Siazanneft' [Siazan Oil Production Association].

Do 2.38 million rubles' worth of housing-overhaul work;

do 490,000 rubles' worth of work on amenities for workers' settlements; and

plant 20,000 shrubs and trees in the oil regions.

12. Increase the skills of 50 blue-collar workers above the plan and include 30 engineers and technicians in production and engineering training at p.o Azneft' enterprises and organizations without interrupting production.

13. Include 12,000 blue-collar workers, engineers and technicians in economic education during the 1983/1984 training year.

14. In carrying out May 1982 CPSU Central Committee Plenum decisions, continue work on the expansion of subsidiary farms of the association's enterprises and on the extension of patronage assistance to kolkhozes and sovkhoses.

15. Through the social eating system, realize for workers the following products of subsidiary farms:

| | |
|---------------------------------|--------------|
| meat (on-the-hoof weight) | 110.0 tons |
| eggs | 800,000 each |
| vegetables, including cucumbers | 117 tons; |

and increase henhouse capacity at subsidiary farms to 100,000 birds.

In assuming the socialist commitments, the p/o Azneft' collective challenges the Turkmenneft' and Gruzneft' p/o's [Turkmen and Georgian Oil Recovery Associations] to socialist competition.

The socialist commitments were adopted at an expanded soviet of p/o Azneft' directors on 21 January 1984.

VPO Kasporneftegazprom [All-Union Caspian Sea Offshore Oil and Gas Industry Association]

The laboring collectives of VPO Kasporneftegazprom, guided by the decisions of the 26th CPSU Congress and November 1982 and June 1983 CPSU Central Committee Plenums and the statements and principles of CPSU Central Committee General Secretary Chairman of the USSR Supreme Soviet Presidium Yu. V. Andropov, marked the year 1983, the core year of the 11th Five-Year Plan, with a new contribution to the conquest and development of Caspian Sea oil and gas fields.

Continuing the search for new and the delineation of previously discovered deposits in the Apsheron and Baku Archipelago areas, and also on the Turkmen shelf, association workers achieved high efficiency in geological exploration and provided for the fulfillment of plans for growth of oil (including concentrate) and gas reserves.

Successful penetration and completion of well No 4 of the b. [Bay] of Andreyev, which was 6,715 meters deep, was a great achievement by the explorers of the earth's depths.

Intense work was done to develop the promising Field imeni 28 Aprelya from offshore stationary platforms that were manufactured by our own forces and installed at a sea depth of more than 100 meters.

As a result of the execution of a major complex of geological-engineering measures and operations to build up the fields' facilities, the VPO Kasporneftegazprom collective coped successfully with the 1983 plans for oil and gas recovery. By last year the level of oil (and condensate) recovery not only had been stabilized but it had grown by 166,500 tons, or 1.9 percent. Recovered above the plan were 26,500 tons of oil and 291.4 million m³ of gas.

Plan indicators for realizing industrial output, for increasing labor productivity, for introducing fixed capital and for doing construction and installing work were overfulfilled.

Introduced into operation were 47,500 m² of housing, which enabled the lag of previous years of the 11th Five-Year Plan to be eliminated.

Many enterprise, department and brigade collectives fulfilled plans for 1983 and the first 3 years of the five-year plan ahead of time. These included the winners of the All-Union socialist competition--workers of Kaspneftegazflot [Caspian Oil and Gas Fleet] Administration, the P/o imeni 22d CPSU Congress, the drilling brigades of Surid Dzhafar-zade (of the Neftyanyye Kamni UBR), Eduard Aslanov (of the Bulla URB), Alovzat Regimov (of the Sangchaly UBR), the oil-and-gas recovery brigades of El'khan Salekhov (of the NGDU imeni Serebrovskiy), Khadzhiyaz Tkachev (of the P/o Chelekenmorneftegazprom [Cheleken Offshore Oil and Gas Industry Association] and Musa Mamedaliyev (of the NGDU imeni N. Narimanov), well-overhaul and current-maintenance brigades of Adyl' Mamedov (P/o imeni 22d CPSU Congress) and Guseyn Guseynov (of the NGDU of Artemneftegaz [Artem Oil and Gas Production Association]), and so on.

The offshore oil-and-gas recovery workers adopted as a specific program the decisions of the December 1983 CPSU Central Committee Plenum and Ninth Session of the USSR Supreme Soviet, and the principles and conclusions of a speech by CPSU Central Committee General Secretary Comrade Yu. V. Andropov. They are aiming labor collectives toward raising in every possible way the efficiency of all elements of oil and gas recovery work, work quality, and creativeness in the use of existing reserves, at strengthening discipline and responsibility, and at working with maximum use of efforts and knowledge.

The VPO Kaspornftegazprom collective, sustaining the patriotic initiative of the country's advanced workers, who have been promoting the struggle to achieve above-plan growth in labor productivity and a reduction in the prime cost of producing output, adopts the following socialist commitments for 1984:

achieve a 1-percent increase above the plan in labor productivity and, on that basis, provide for an increase in the amount of realized industrial output by 4.4 million rubles' worth;

by improving schemes for developing the fields, introducing progressive equipment and technology widely, and accelerating the assimilation of capacity, recover 500,000 tons of crude and 200 million m³ of gas and produce 2,000 tons of stabilized gaseous gasoline above the plan;

through improved use of materials and raw-material resources and intensification of the savings campaign in all production elements, reduce the prime cost for producing industrial output by 0.5 percent and obtain at least 2 million rubles of profit above the plan in the industry;

with a view to providing for overfulfillment of the plan for growth in oil and gas reserves, complete the construction of one exploratory well above the plan;

by the improvement of work organization, strict observance of operating procedures and drilling directives and the introduction of highly productive rock-breaking tools and effective chemical reactants, drill through 1,500 meters of rock above the plan;

complete the construction of two wells at the Field imeni 28 Aprelya;

systematically improve operation of the existing well inventory, and introduce from the inactive list one well above the goal;

by improving the operating mode of gaslift-well installations, reduce the specific consumption of working agent per ton of recovered crude;

convert 10 wells above the goal to deep-pump operation;

improve the operating modes of installations that gather, treat, store and repump crude; and reduce losses of crude by 1 percent more than called for by the standards;

execute above the plan 150 geological-engineering measures and make 100 tests of wells, for a total benefit of 40,000 tons of crude;

continue work to improve secondary methods and to expand tertiary methods for recovering crude. Recover at least 2.5 million tons of crude by these measures;

through the use of equipment, improvement in technology and improvement in the organization of work, perform 55 overhauls and 200 repairs of wells above the plan. Reduce the time taken per overhaul and current maintenance of wells by an average of 5 percent; and increase productive time during repair work by 5 percent;

by taking steps to improve quality, insure that at least 95.5 percent of shipments of crude to customers are in the first and second quality groups;

provide for 90,000 rubles' worth of above-plan output with the State Emblem of Quality;

by using advanced work methods and brigade cost accounting during construction, perform 2.0 million rubles' worth of construction and repair work and overhaul of offshore hydraulic-engineering structures above the plan;

develop and introduce additional measures aimed at preventing pollution of the Caspian Sea; raise the utilization effectiveness of water-storage objects; and increase the amount of recirculated water supply by 5 million m³;

through the effective use of automotive and marine transport, haul above plan 115,000 tons of freight by automotive transport and 25,000 tons of cargo by sea transport; and work the fleet an additional 5,000 ship-hours;

widely promote socialist competition to intensify the campaign for savings and thriftiness under the slogan, "The economy must be economical," by providing on that basis for the careful use of raw and other materials and fuel and power resources. Save 2.0 million kWh of electricity, 200 tons of ferrous metals, 160 tons of automotive gasoline, 570 tons of diesel fuel, 2,000 tons of boiler and furnace fuel (in standard fuel equivalents), 500 gigacalories of heat energy, and 32 tons of lubricating oil;

as a result of accelerating the pace of scientific and technical progress, increasing the effectiveness of scientific research and developments, and developing the rationalizers' and inventors' movement, get an economic benefit of 4.2 million rubles from introducing rationalizers' suggestions and inventions and 4.5 million rubles from measures for technical progress;

by USSR Constitution Day, convert fully oil-and-gas recovery department No 6 of the P/o imeni 22d CPSU Congress to microprocessor equipment for the ASUTP [automated system for controlling industrial processes] for the gaslift recovery of crude;

constantly improve ideological work and moral indoctrination in labor collectives, include 24,000 people in economic education, train 1,640 new workers, and raise the qualifications of 6,660 workers;

in accordance with the program for social development, provide for the fulfillment of established plans for introducing housing and cultural and domestic-services facilities; eliminate at least 1,500 m² of emergency-housing area and resettle families in well-appointed apartments; use 1.3 million rubles on measures for improving the cultural and domestic-services conditions for workers; and plant 5,100 trees and shrubs;

do at least 3.0 million rubles' worth of work on sanitation and public-health measures and on measures for improving working conditions;

implement CPSU Central Committee, USSR Council of Ministers and AUCCTU decrees about the further development and increase in efficiency of the brigade form of organization and work incentives, and in 1984 bring the coverage of the brigade form of organizing work up to at least 70 percent for the basic types of activity and insure that at least 2,600 workers in drilling and construction operations work under the brigade-contract method;

expand comprehensive patronage assistance to the republic's kolkhozes and sovkhozes, and do work to develop existing and to create new subsidiary farms; and

in accordance with the USSR Law on Working Collectives, raise in every way possible their role in controlling production and strengthening labor discipline, strive for the labor activeness of the collective's members, and develop socialist competition for high effectiveness in production and work quality.

VPO Kasporneftegazprom workers assure the CPSU Central Committee, the Azerbaijan Communist Party and the Ministry of Gas Industry that they will exert all their strength, energy and knowledge to the successful execution of the plans and commitments that have been adopted and will make a worthy contribution to executing the Leninist party's program to strengthen the country's fuel and power complex.

The VPO's collective challenges Azneft', Turkmengazprom [Turkmen Gas Industry Association] and Ukgazprom [Ukrainian Gas Industry Association] to socialist competition.

The socialist commitments were discussed and adopted at a joint expanded session of the Soviet of VPO Kasporneftegazprom and the Presidium of the Azerbaijan Republic Committee of the Trade Union of Oil and Gas Industry Workers on 11 January 1984.

Minneftekhimprom [Ministry of Petroleum Refining and Petrochemical Industry] of the Azerbaijan SSR

Having been actively included in the socialist competition for successful fulfillment and overfulfillment of the 11th Five-Year Plan, Azerbaijan's workers successfully completed the year 1983. Blue-collar workers, engineers, technicians and white-collar workers of Azerbaijan's oil refining and petrochemical industry enterprises and organizations made their contribution to the republic's achievements.

The foundation for the high goals that the industry's oil-refinery workers plan for the current year was laid during the third year of the five-year plan. Back on 25 December the ministry met the plan for realized industrial output volume.

The 1983 socialist commitments adopted by the industry's collectives were fulfilled for the main technical and economic indicators. During the first 3 years of the five-year plan, labor productivity grew 113.1 percent versus the approved five-year goal of 110.6 percent, tens of millions of rubles' worth of products with the State Emblem of Quality were produced above the plan, a set of measures for protecting the environment was implemented, and fuel and power resources were saved.

Collectives of the NBNZ [Novyy Baku Oil Refinery] imeni Vladimir Il'ich and the Sumgait Additives Plant are marching in the vanguard of the socialist competition that is being promoted. During 1983 these collectives repeatedly were among the winners of the All-Union and republic socialist competitions and were awarded challenge Red Banners of USSR Minneftekhimprom and the Central Committee of the Trade Union of Chemical and Petrochemical Workers and of Azerbaijan SSR Minneftekhimprom and the Azerbaijan Republic Committee of the Trade Union of Chemical and Petrochemical Industry Workers.

The collectives of a number of operating installations and brigades reported completion of the 1983 plan ahead of schedule. Among them were workers of installations Nos 22, 31 and 32 of NBNZ imeni Vladimir Il'ich, No 406 of BNZ [Baku Oil Refinery] imeni 22d CPSU Congress, and Nos 21, 25, 26, 29 and 41 of BNZ imeni A. G. Karayev.

Major successes were achieved last year, but still higher goals, which were determined by the 26th Party Congress and by later CPSU Central Committee Plenums, are to be adopted.

The party is calling for the complete use of the masses' enthusiasm and the inexhaustible springs of the people's initiative. In considering this powerful factor, the CPSU Central Committee supported a proposal to set specific goals for laboring collectives--to increase labor productivity by 1 percent over the plan and to reduce the prime cost of producing output by 0.5 percent. "This," emphasized Comrade Yu. V. Andropov, "must be viewed as an additional plan task for the party."

This party call found enthusiastic support also among Azerbaijan Minneftekhimprom laboring collectives.

In directing their efforts toward a further rise in production efficiency, using available reserves and disseminating advanced production experience, oil-refinery and petrochemical-industry workers adopted the following socialist commitments:

carry out the annual plan for production volume by 29 December and produce above the plan 5,000 rubles' worth of output;

produce the following output above the plan:

| | |
|-----------------------------------------------|-------------|
| aviation kerosene | 15,000 tons |
| diesel fuel | 30,000 tons |
| oil asphalt for roads (viscous and liquid) | 50,000 tons |
| diesel oil for agricultural needs | 3,000 tons; |

provide for labor productivity to grow 1.0 percent above the established goal;

reduce the prime production cost of output being produced by 0.5 percent;

provide 2 million rubles' worth of output in the highest quality category above the plan;

by reducing material consumption, make 500,000 rubles of above-plan profit;

master the process of double-stage filtration of oils at the BNZ imeni 22d CPSU Congress—at the deparaffinization installation to enable the output of deparaffinated oil to be increased 3 percent;

provide for an increase in the severity of the refining of crude by 1 percent;

by introducing inventions and rationalizers' suggestions, obtain an economic benefit of 5 million rubles;

get an economic benefit of 1 million rubles from introducing measures for new equipment and NOT [scientific organization of work];

reduce water consumption by 10 percent in comparison with the plan;

reduce discharges of harmful substances into the atmosphere by 5 percent in comparison with the plan;

reduce the standards for oil and petroleum-product losses below the 1983 norms by 0.3 percent;

intensify the savings campaign and save the following resources during 1984, taking into consideration the goal for additional savings of fuel and power resources:

| | |
|-------------|---------------------------------------------|
| electricity | 11.5 million kWh |
| heat energy | 58,000 gigacalories |
| fuel | 31,000 tons of standard fuel equivalent; |

raise the qualifications of 2,000 workers;

include more than 4,000 people in training in the economic-education system and in schools for communist labor during the 1983/1984 training year;

expand patronage ties with kolkhozes and sovkhoses, and extend them help in building agricultural, cultural and domestic-services facilities;

put 8,100 m² of living space into use; and

introduce the Palace of Domestic Services at the BNZ imeni 22d CPSU Congress into operation during the first quarter of 1984.

Workers of the Azerbaijan SSR's oil-refining and petrochemical industry assure the Azerbaijan Communist Party Central Committee and the Azerbaijan SSR Council of Ministers that henceforth they will both strengthen and multiply in every possible way the successes that have been achieved and will make maximum efforts to be members of the vanguard of the All-Union socialist competition.

Adopted at an expanded session of the Azerbaijan SSR Minneftekhimprom Board and the Presidium of the Azerbaijan Republic Committee of the Trade Union of Workers of the Chemical and Petrochemical Industry on 10 January 1984.

Azerbaijan SSR State Committee for Gasification

Azerbaijan SSR gas-industry enterprises, in carrying out the historic 26th CPSU Congress decisions about improving the welfare of the Soviet people, and having been actively included in the nationwide socialist competition to fulfill the 11th Five-Year Plan ahead of time, achieved great successes during the third year of the five-year plan and provided for accidentfree work and an uninterrupted supply of gas to consumers.

Azerbaijan SSR Goskongaz [State Committee for Gasification] enterprises realized during the 11th Five-Year Plan's third year 16.5 billion m³ of natural gas and 55,200 tons of liquefied gas, extended 8.6 million rubles' worth of domestic services to the populace, and equipped 58,244 apartments for gas, 49,000 of them in the countryside.

Natural and liquefied gas supply covers 110 cities, towns and urban-type settlements and more than 350 rural communities. More than 600 industrial facilities, 11,000 municipal, housing and cultural institutions and more than 2,000 boilerhouses are consuming gas as a fuel or raw material.

The number of apartments throughout the republic that are equipped for gas is 1,168,000, including 429,000 in the countryside.

The degree of coverage of gasification of the housing inventory on 1 January 1984 was 91.6 percent, including 98.9 percent of the urban and 83.4 percent of the rural housing inventories.

By improving the forms and methods of socialist competition, using creatively the initiative of advanced production workers and innovators, raising labor productivity in every possible way, reducing the prime costs of production, raising the quality of the output produced, and mobilizing all discovered and unused production reserves, blue-collar workers, engineers, technicians and white-collar workers of Azerbaijan SSR Goskongaz enterprises and organizations, after studying their potential, adopt the following socialist commitments for 1984.

For the Basic Activity

Carry out by 28 December 1984 the annual plan for receiving and realizing natural gas, and realize 130 million m³ of additional gas.

Carry out the annual plan for realizing liquefied gas by 30 December 1984.

Reduce the prime cost of producing 1,000 m³ of realized natural gas by 0.2 percent and 1 ton of realized household liquefied gas by 1 percent, and get a saving of 50,000 rubles by reducing prime costs.

By introducing new equipment, intensifying work on overhauling gas lines, rapidly finding and eliminating the causes of gas leaks, and optimizing operating modes for gas lines, cut gas losses during transport by 5 million m³ below the plan-allowed amount.

By reducing the mobilization of additional internal economic reserves, intensifying the savings campaign and overfulfilling labor productivity goals, obtain in 1984 an above-plan profit of 20,000 rubles.

By meeting the goals for introducing new equipment and advanced experience and introducing rationalizers' suggestions into production, obtain an economic benefit of at least 130,000 rubles.

By improving the use of fixed capital, increase yield on capital by 0.1 percent over the level reached in 1983.

Train 180 workers in the system for technical and economic training and increase the skills and teach secondary trades to 140 workers.

By developing and taking steps to raise the gas utilization effectiveness of gas-burning units, save at least 30,000 rubles' worth of fuel in the republic's economy.

In 1984 raise the quality of servicing and effectiveness in the use of protection for underground gas mains.

For Industry

Carry out the 1984 plan for production volume by 28 December 1984 and realize 25,000 rubles' worth of additional output.

Generate in physical terms 55 tons of liquefied gas above the plan.

Work systematically to raise the quality of the output produced.

By a universal campaign for savings and thriftiness, save:

standard fuel equivalent
electricity

at least 45 tons
10,000 kWh

By introducing new equipment and progressive technology and by mechanizing labor-intensive operations, raise labor productivity 0.6 percent above that achieved in 1983.

For Construction

Carry out the annual plan for contracting work by 30 December 1984 and do 60,000 rubles' worth of additional work.

Overfulfill the plan for construction and installing work by 40,000 rubles by in-house efforts;

By the end of 1984, bring the level of gas services for the republic's housing inventory up to 92.5 percent--to 96.7 percent in the urban and 83.8 percent in the rural housing inventories.

Raise construction and installing work quality, and provide for the turnover of facilities with "good" and excellent" evaluations only.

Overfulfill capital investment by 100,000 rubles.

Provide for the release of natural gas to 30 cities, kolkhozes and sovkhoses.

Intensify the work pace in supplying gas to rural communities.

Prepare the cities of Martuni, Fizuli, Agdzhabedy, Kubatly, Kutkashen, Yalama, Khudat and Kuba to receive natural gas.

Complete the construction of gas line outlets to the cities of Kubatly, Agdam-Martuni-Fizuli, Yalama-Khudat, Kuba and Kusary.

Provide for the equipping of 46,000 apartments for gas, 40,000 of them in the countryside--20,000 for natural gas.

For Household Service

Carry out the plan for realizing service to the population by 28 December 1984.

Extend 80,000 additional rubles' worth of service, including 60,000 rubles worth to agriculture.

Carry out the annual plan for selling liquefied gas to the population by 29 December 1984. Realize 300 tons of liquefied gas above the plan, after extending 30,000 additional rubles' worth of service to the population.

By improving educational work and strengthening monitoring over the work of enterprises, eliminate violations of the rules for servicing the population.

With a view to improving municipal and household service to the population, replace 6,000 household and gas appliances in 1984.

The socialist commitments were discussed by enterprise and organization collectives and were adopted on 14 December 1983 at a meeting of economic, party and trade-union activist worker elements of Azerbaijan SSR Goskorgaz.

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CASPIAN SEA OIL EXPLORATION OPERATIONS SURVEYED

Baku AZERBAYDZHANSKOYE NEFTYANOYE KHOZYAYSTVO in Russian No 5, May 84 pp 1-6, 10-15

[Article by Kh.B. Yusufzade, Kasporneftegazprom [Caspian Sea Oil & Gas Industry] VPO [All-Union Production Association]: "Results of Geological Exploration Operations During Three Years of the 11th Five-Year Plan and Offshore Objective for 1984-1985 in the Caspian Sea"]

[Text] In 1981-1983 the Kasporneftegazprom VPO continued carrying out offshore geological exploration efforts in Azerbaijan, Turkmen and Kazakh sectors of the Caspian Sea. The goal of these explorations was the mapping of recognized oil and gas deposits in a cross-section of the productive (Azerbaijan sector) and the terra-rossa strata (Turkmen sector), as well as searching for oil- and gas-bearing Mesozoic deposits (Kazakh area) (Figure 1).

The Kaspneftegazgeofizrazvedka [Caspian Oil & Gas Geophysical Exploration] Trust conducted offshore geophysical operations to explore and prepare structures for exploration by deep drilling.

During the three years of deep exploration some 20 areas were explored, including 14 in the Azerbaijan, 5 in the Turkmen and 1 in the Kazakh areas of the Caspian. During this time the Alyaty-more field was discovered and five oil and gas reservoirs found. Exploratory and prospecting effectiveness for category B+C₁ oil and gas reserves coming in per meter of footage drilled, was high during 1981-1983. The Kasporneftegazprom VPO surpasses many of our country's regions by this index.

Exploratory drilling volume amounted to 276,400 meters and 42 wells were sunk, 32 of which, or 76.2 percent were producers, indicating high effectiveness of the geological exploration operations. The plan to increase oil and gas reserves was fulfilled by 102 percent. Preparation cost of a unit of oil and gas reserve is much lower than in many of the oil-producing regions of our country.

Exploration and prospecting well-depths have increased. Drilling of Well No 4, with a bottomhole depth of 6,715 meters, was completed in 1983. Along with the increase in well depths, operable sea depths have also increased. For the first

Figure 1



- Key:
- | | |
|---------------------------------------|--------------------------------|
| 1. Apsheronian Bank | 25. Prichelekinskiy Kupol |
| 2. Darwin Bank | 26. Zapadno-Ogruchinskaya |
| 3. Artem Island | 27. Zapadno-Erdeklinskaya |
| 4. Gyurgyany-more | 28. Zapadno-Okaremskaya |
| 5. Shiloy Island | 29. Sangachaly-more |
| 6. Lokbatan-more | 30. Duvanny-more |
| 7. Peschanny-more | 31. Alyaty-more |
| 8. Bakhar | 32. Bulla Island |
| 9. Yuzhnaya | 33. imeni Samedov |
| 10. Yuzhnaya-2 | 34. Shakhovo-more |
| 11. imeni Aza Aslanov | 35. Garasu |
| 12. Neftyanye Kamni | 36. Bulla-more |
| 13. Neftyanye Kamni | 37. Andreyev Bank |
| 14. imeni 28 Sprelya | 38. Kamen' Persiyanina |
| 15. imeni Kaverochkin | 39. Kamen' Ignatiya |
| 16. imeni 26 Bakinskikh Komissarov | 40. Kornilova-Pavlova |
| 17. Promezhutochnaya | 41. Golovachev Bank |
| 18. Livanova-zapadnaya | 42. Skalistaya |
| 19. Livanova-Tsentral'naya | 43. Peschanomysskaya |
| 20. Livanova-Vostochnaya | 44. Peschanomysskaya-yuzhnaya |
| 21. imeni Barinov | 45. Sarzha-more |
| 22. imeni Gubkin | 46. Zapadno-Rakushechnaya-more |
| 23. LAM Bank | 47. Rakushechnaya |
| 24. Zhdanov Bank | 48. Duvanny-more-2 |

time, our country has set up a drilling platform in 110 meters of seawater, and semisubmersible drilling rigs (PPBU) are already operating at depths of up to 170 meters. During three years of the five-year plan the following basic geological results have been obtained in separate areas:

The Apsheronian Archipelago and the western section of the Apsheronian-Balkhan uplift zone: Exploration and prospecting operations were carried out in this water area in the Bakhar, Yuzhnaya-2, Andreyev Bank, Apsheronian Bank and imeni 28 Aprelya areas. At the end of 1983 exploratory operations were begun on the imeni Kaverochkin structure.

As we know, the most important result of exploratory operations on the Caspian Sea in the last few years has been the discovery and putting into trial operation of the imeni 28 Aprelya field* (Figure 2).

According to the data available from three years of the 11th Five-Year Plan, the contours of the X horizon oil- and gas-bearing Balakhanskaya and "break" suites on the southwest limb of the fold, have been substantially expanded. On this same limb, in Well Number 11, which was drilled from a semisubmersible rig, a gas condensate influx was obtained during tests at the 3,647-3,621-meter interval with a formation tester, yielding 400,000 cubic meters of gas and 80 tons of gas condensate per day through a 7 mm. choke, with Pbuffer = 30 MPa, the same at which a new deposit was discovered in KaS. Once again this confirms the multilayeredness of the above field.

Two formations will be tested in this well: the PK and the NKP, oil and gas shows from which will increase the potential reserves of the deposit (Figure 3).

The presence of oil and gas in the X horizon of the Balakhanskaya suite and the "break" suite on the northeast limb of the fold has been substantiated by wells 5, 2 and 12, the drilling of which has been completed.

At Well No 5, commercial inflow of oil and gas was obtained from the Balakhanskaya and "break" suites during tests with a formation tester.

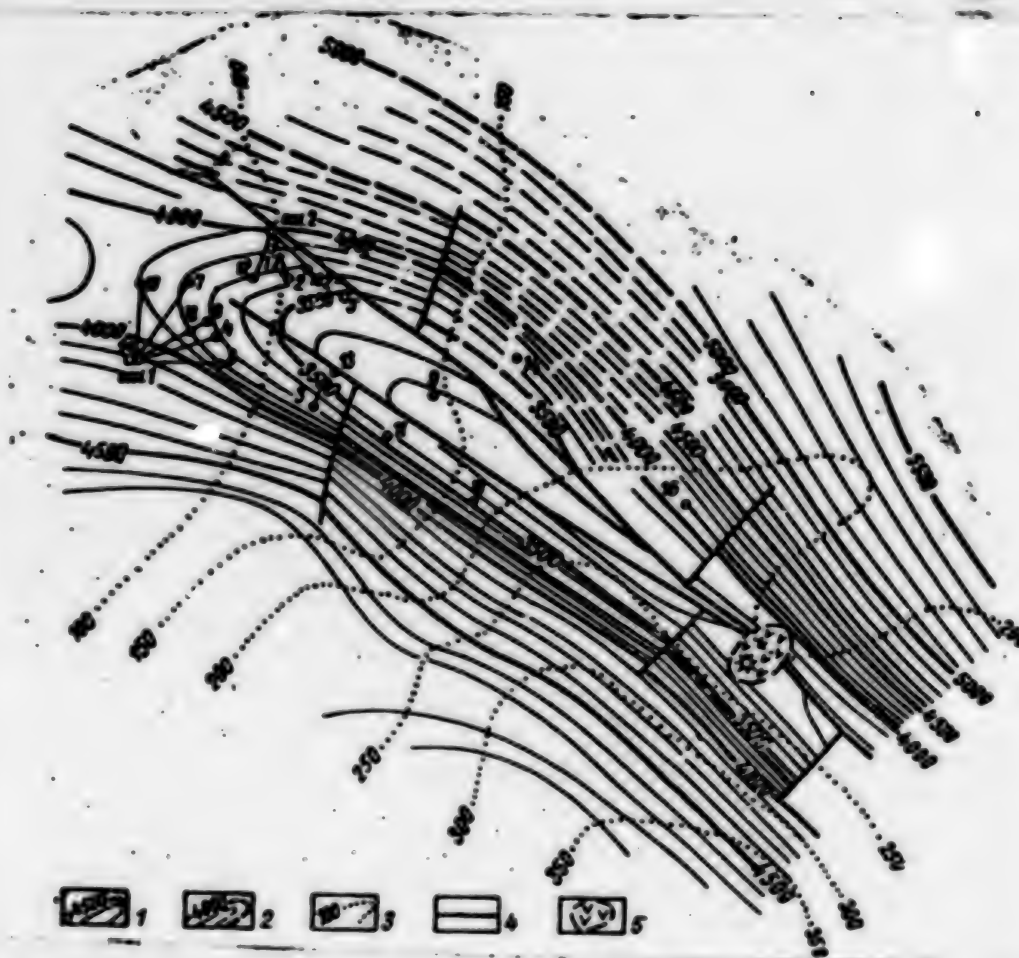
Two other wells are operating within the following parameters: Pbuffer = 9.100 and 9.200 MPa; (illegible) = 440 and 460 tons per day through 14-mm flow chokes.

At present, eight wells in this area are in constant operation with an average daily yield of about 3300 tons of crude oil and 300,000 cubic meters of gas. Contouring of recognized formations and exploration of new ones continues.

Besides stationary platforms No 1 and 2, development well drilling platforms 3 and 4 are being built. Development wells 103 and 105 are presently being drilled from Platform No 2, and exploratory well 19 is being drilled from Platform No 1. Exploratory well 14 is being drilled from the Kaspomorfeft' SPBU [stationary drilling rig]. Preliminary exploration is slated for completion before the end

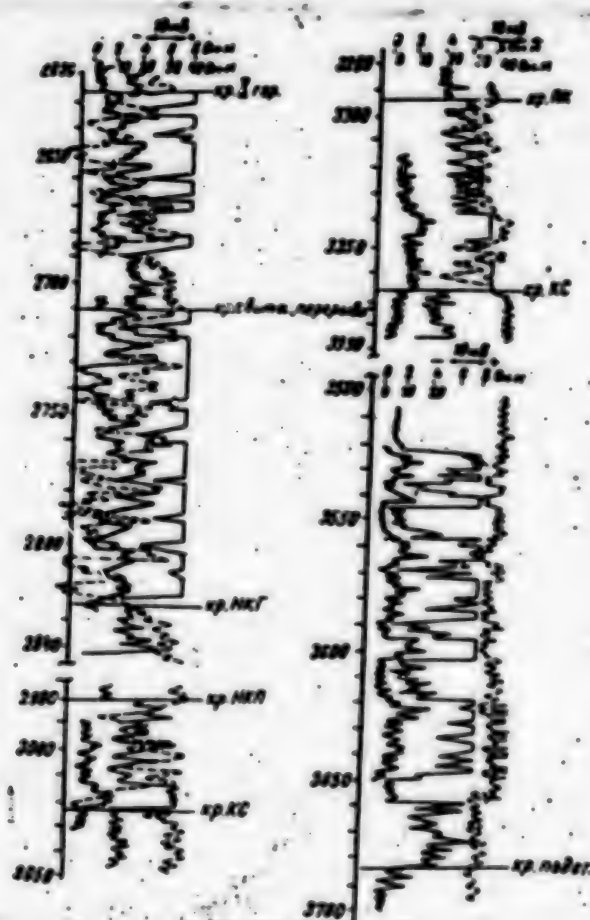
*Yusufzade Kh.B. The imeni 28 Aprelya Field in the Caspian Sea. Azerbaydzhanskoe Neftyanoye Khozyaystvo, 1980, No 1, pp 11-14.

Figure 2



- Key:
1. isolines along SG-III (in KaS)
 2. isolines along SG-III, replotted, based on new deep-drilling data (October, 1983)
 3. depth contours
 4. fractures
 5. volcanic mud breccia

Figure 3



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The Alyaty-more oil field was discovered within the boundaries of the Baku Archipelago, to the south of the Sangachaly-more area.

The presence of oil and gas is confined to the 7th horizon of the Middle Pliocene pay section. From the 3,657-3,636-meter interval in Well No 6 a flow of oil (100 tons per day), water (130 cubic meters per day) and gas (60,000 cubic meters per day) was obtained through a 12-mm choke at Pbuffer = 100 MPa.

The horizon is predominantly composed of sand-silt facies.

At present, wells 7, 8, 9 and 12 are being drilled in order to contour recognized deposits and search for new deposits. Of these, Well No 12 will be sunk from an SPBU to the KaS horizon with a projected depth of 5,000 meters.

The oil and gas-bearing contours of horizon VII in blocks 3 and 5 on the north-east limb of the field, and pay section horizons V and VII on the southwest limb of the Bulla Island structure were expanded to the Sangachaly--Duvanny-more--Bulla Island areas as a result of exploration and prospecting operations.

An oil flow yielding 130 tons per day through a 12-mm choke at Pbuffer = 13.3 MPa was obtained during tests of the 5,453-5,421-meter interval (in Horizon VII) of Well No 558, drilled in block 2. Thus, the oil- and gas-bearing contour of the VII horizon pay section was significantly expanded, making it possible to increase the number of exploratory drilling sites to 30.

An oil inflow, yielding 150 tons of oil and 50,000 cubic meters of gas per day through a 12-mm choke at Pbuffer = 5.5 MPa, was obtained during tests of the strata in the 4,846-4,821-meter interval in the Bulla Island area from Well No 570, located on the southwestern pericline. As a result, the presence of oil and gas has been established on the VII horizon in an independent tectonic block.

At the present time, Well No 573 is being drilled from this platform to search for deposits of gas and condensate in a cross-section of the VIII horizon, and also to trace out the known deposit in the VII horizon. In addition, an oil flow yielding 120 tons of oil and 80,000 cubic meters of gas per day through a 10-millimeter choke at Pbuffer = 17 MPa, was obtained from Well No 568 during tests of the 5,646-5,613-meter interval (VII horizon) on the southwestern limb of this fold, confirming commercial oil and gas presence in the VII horizon on this section of the fold.

In 1984 and 1985, exploration and prospecting operations will continue on the indicated areas for contouring established, and exploration of new, oil- and gas-bearing sections bound by tectonic fractures or lithologic and stratigraphic traps.

Within the Baku Archipelago, one of the producing fields is the Bulla-more, where exploration and prospecting operations were conducted from 1981 to 1983, tracing deposits in the VII horizon of the pay section, and exploring deposits in the VIII horizon and the PK site. In 1982 a new pool was discovered in the

VIII horizon of the pay section, the first on the northwestern pericline of this structure. In Well No 56, during tests of the 6,097-6,688-meter interval a flow was obtained, yielding 850,000 cubic meters of gas, 150 tons of crude oil and 200 tons of condensate per day at Pbuffer = 24.8 MPa through 16- and 18-millimeter flow beans. This result made possible significantly expanded exploratory operations in the VII horizon.

During these years, a tabulation, by deposit, of reserves was prepared and presented to the GKZ. This tabulation was approved with a rating of "excellent."

Completion of contouring operations of the VII horizon pool, and the appearance of the presence of PK gas and oil from the PT suite is expected in 1984 and 1985.

One of the promising areas on the Baku Archipelago is the Andreyev Bank, located to the southwest of the Bulla-more area. The VII horizon was first tapped in this area in 1983 at a depth of 6,618 meters.

Considering the favorable character of the uncovered VII horizon, according to geophysical data, the 6,673-6,664-meter, and the 6,662-6,655-meter intervals were subsequently tested. During these tests, no flow was obtained.

In spite of the negative results regarding the presence of oil and gas, drilling the well produced much geological material, allowing us to determine the future direction of exploration and prospecting operations. According to data obtained from core samples and the field and geophysical investigations, the hypsometric status of the horizons has been more accurately defined, the volume characteristics of the reservoirs and the lithological and facial composition of the pools have been studied and the presence of reservoirs favorable to the accumulation of commercial-grade reserves of oil and gas has been established.

In addition to the above, exploration and prospecting operations will be continued on this archipelago in 1984 and 1985 in the Kamen' Ignatiya and Garasu areas to discover new oil and gas deposits. Thorough geophysical, geochemical and other research is scheduled to prepare structures by deep drilling in this oil- and gas-bearing region.

In the Turkmen sector, explorations for oil and gas pools continued in the terrassa stratum deposits, and in the underlying red stratum. Simultaneously the problem of outlining previously discovered pools was resolved.

In 1983, in the Zhdanov Bank field, flow was obtained from the X horizon in the 4,335-4,727m interval during tests of a formation from Well No 35, yielding 30 tons of oil, 50,000 cubic meters of gas and 30 cubic meters of water per day through a 6 mm choke at Pbuffer = 20 MPa.

According to these results, the oil- and gas-bearing contour of the X horizon pool has been expanded and oil reserves increased. And according to the test data from wells 51 and 53, which have come in with yields of 90 to 100 tons of crude oil through a 9 mm choke at Pbuffer = 14 to 15 MPa, a new oil pool has been discovered at the IV horizon in the KT in the LAM Bank field. In addition, oil show has appeared from the VII horizon of the KT in an individual tectonic

block in the eastern section of the field, according to test data from Well No 20, in the 4,457-4,451-meter interval, from which oil inflow was obtained, yielding 30 tons per day through a 5-mm choke at Pbuffer = 5.5 MPa.

Further exploratory operations are scheduled in 1984 and 1985 to contour known deposits and search for new oil accumulations in the deep-seated horizons in the pools of the PKT of the IAM Bank, Livanova-Vostochnaya, imeni Barinov, Prichelezenskiy Kupol and Gubkin Bank areas.

Prospects for the discovery of new oil and gas fields in this area of the Caspian Sea are linked with the introduction of deep-water exploration of such structures as the Zapadno-Okaryemskaya, Livanova-Tsentral'naya, Livanova-Zapadnaya, Fedynskogo, Fersmana etc.

In 1983, in the Kazakh section of the Caspian, contour interval drilling was resumed of the Paleological basement rocks, located ashore in the Oymash area to determine the possible oil and gas saturation. Drilling was done from a stationary rig on Well No 4 on the Rakushechnaya-more structure. But at a depth of 511 meters a breakdown occurred during drilling operations, and the well, spouting gas and water, was abandoned.

In all probability, well output was connected to Upper Cretaceous deposits (the roof of Cretaceous deposits being 450 meters).

Structure drilling is being carried out in the Zhaga-more area. Drilling of Well No 1 has been completed, and drilling of Well No 2 has been started. Deposits of the Upper Jurassic (Oxfordian stage), have been uncovered in a section of Well No 1 at a true depth of 1,755 meters. Enough geological, geophysical and core materials have been obtained to permit the first study of stratigraphic and lithologic and facial section cuts from the deposits making up the area to accurately describe its structure.

Within the boundaries of the Kazakh sector, alongside the foregoing operations, mapping operations have also been continued to make a geological map of the sea floor in the areas of Zapadno-Peschanomysskaya, Rakushechnaya-more, Tokmak-more etc.

An operation has been carried out to study the engineering and geological nature of the soils in the area of Peschanomysskoye-more and Rakushechnaya-more, for the erection of a stationary drilling rig.

In 1984 and 1985, there are plans to continue the efforts started in this offshore area.

In the Kazakh and Astrakhan areas, seismic survey information has been obtained which tentatively characterizes the structure as both a Jurassic-Cretaceous and Permo-Triassic deposit system.

In addition, preliminary hydrogas survey data in these sectors point to the relatively weak differentiation of the gas field. Anomalous sections with increased gas content values in sea water and individual deposits separated on seismo-acoustic logs positively correspond in the plan to the Timur and Akhsu-more uplifts.

In addition, isolated zones connected dislocations with breaks in continuity have been noted.

There are plans to increase the volume of geophysical operations in this section of the Caspian Sea in 1984 and 1985.

Thus, the results of the exploration and prospecting operations of 1981-1983 urge us to continue them in 1984 and 1985 in the areas imeni 28 Aprelya, Alyaty-more, Bulla Island, Bulla-more (VII horizon, PK), imeni Kaverochkin, LAM Bank, Livanov Bank, Gubkin Bank, Zhaga-more etc.

The basic volume of drilling operations will be concentrated in the indicated areas; deep-seated strata-surveying and development of deepwater sections of the sea will continue.

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OIL AND GAS

CASPIAN SEA OIL, GAS EXPLORATION PROSPECTS DISCUSSED

Baku AZERBAJDZHANSKOYE NEFTYANOYE KHOZYAYSTVO in Russian No 5, May 84 pp 1-7, 10-15

[Article by A.N. Gadzhiyev and F.G. Ragimkhanov of the Kaspneftegazgeofizrazvedka Trust: "Prospects for Exploration of Caspian Sea Nonanticlinal Traps"]

[Text] The Caspian Sea is a huge intracontinental depression in the earth's crust, with a heterogeneous structure which has undergone a complicated course of tectonic transformation. It is confined to a meridional trough which is superimposed on the southern edge of the Precambrian Russian plateau, the Scythian-Turonian epihercynian plateau and the Alpine geosynclinal area. In the opinion of B.F. D'yakov, these geostructural areas are confined to the Caspian areal downwarping, one of the global tectonic-sedimentation structures of the earth's crust. About 200 structures have been found in the Caspian, only a fifth of which have been explored for oil and gas. More than twenty oil and gas fields are being developed here.

Vast potential reserves of Caspian natural resources have shown up. However, the geological structure of the sedimentary layer has been insufficiently studied as yet, especially in the north, central, and southern deep-water sections. Here, the thickness of the sedimentary deposits increases from north to south, the direction in which stratigraphic confinement of oil and gas pools occurs, from the more ancient Paleozoic pools in the north to the younger Miocene-Pliocene pools in the south.

The further development of Caspian resources is primarily connected to the exploration of deposits confined to anticlinal structures.

In connection with the discovery of oil and gas deposits in nonanticlinal traps in the Eastern Ciscaucasus, Mangyshlak and Turkmenia, the problem of prediction, exploration and detection of nonanticlinal hydrocarbon traps on the Caspian is one of the urgent problems in petroleum geology.

During the last few years, the Kaspneftegazgeofizrazvedka VMNPO [expansion unknown] Soyuzmorgeo Trust has been carrying out a wide range of comprehensive geophysical investigations on the Caspian shelf. Nonanticlinal trap explorations are being conducted via seismic survey using advanced digital recording equipment and reprocessing the data on a third-generation computer base, such as "Sayber" etc.

Conclusions regarding the existence of Caspian Sea resources. Were made based on the analyses of accumulated geological and geophysical data, the comparative characteristics of the special features of the geological structure, plus the history of the development of the southern USSR oil and gas basins.

The discovery, in the last decade, of commercial pools in the Karazhanbas, Kavatyube, Kalankas and other fields located on the Buzachi and Astrakhan arched uplifts, indicates a promising outlook for the presence of oil and gas in the Northern Caspian water area.

In the wide range of problems connected with the exploration of nonanticlinal traps, the exploration of paleogeomorphological traps must occupy a special place as one of the most promising trends of Caspian Sea petroleum geology.

According to the results of the paleogeomorphological analysis of the Late Jurassic period by a number of researchers (M.V. Pronichev et al), much of the Caspian-Turonian region comprises a low-lying continental plain, which gently slopes to the southeast and is shaped like a vast amphitheater, bounded by denuded and abraded ledges.

The most characteristic elements of the geomorphological conditions were the ancient valleys which formed the vast deltoid region, three times larger than the present-day Volga delta. This region is buried beneath the waters of the present Caspian Sea (Figure 1).

The Central Caspian region, in the present-day structural plan, is a huge megasyncline and an integral part of the Tersko-Caspian foredeep, which is extended within the boundaries of the water area from Eastern Ciscaucasia. Its axial zone quite distinctly tracks to the Southeast, to the Apsheronian-Balkhan uplift zone.

The Southwestern interior (geosynclinal) edge of this trough has a stepped structure, and is complicated by the regional Derbent fault. The northeastern exterior edge slopes fairly gently, and is migrating to the continental slope.

Results of new geological investigations have significantly altered the previously extant concept of the deep-seated structure of the region under consideration. The stability of the regional slope of all stages of the sedimentary mantle to the east, in the direction of the Peschanomysskaya-Rakushechnaya and the Kara Bogaz arched uplifts is observed here. The fringe zone of separate stages turns up in Miocene-Oligocene and Cretaceous deposits, to which stratigraphic and lithologic traps can be confined.

Along the Cenozoic series of deposits, there is a trough which is unconformably superimposed on separate areas of erosive and tectonic Mesozoic blocks. The buried Inchke-more-East, Makhachkala-more and other Mesozoic uplifts previously detected by seismographic exploration and constituting a fourth line of uplifts on the coast of Southern Dagestan, are especially interesting in this connection. The arched sections of these uplifts underwent washout and denudation in the Late Cretaceous and Early Jurassic period, furthering stratigraphic trap formation.

Figure 1

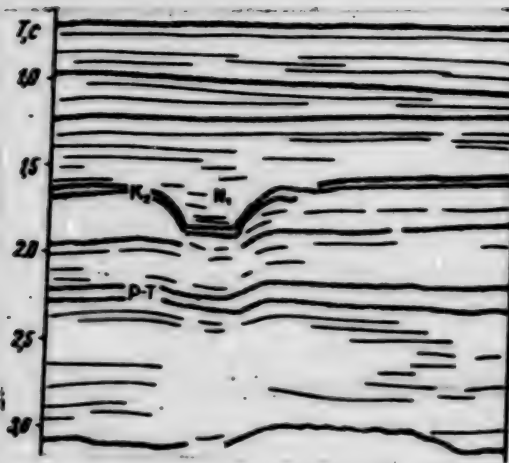


Key: Prospects for exploration of paleogeomorphological and lithologic and stratigraphic traps.

1. Elevations (washdown region) in Jurassic and Cretaceous time
2. The paleo-valley in Jurassic, Cretaceous and Neogene times;
3. Lacustrine basins
4. Alluvial-lacustrine plains
5. Micro-oceanic type Mesozoic-sedimentation-topographic depression
6. Paleo-deltaically-formed obliquely laminated traps
7. Pinch-out zone of Pliocene and Miocene-Oligocene deposits;
8. Oil and gas fields
9. Bars

The discovery of new oil deposits (the Safaralin, Tarkin and Dimitrov), on adjacent land to the north of the city Makhachkala, is a persuasive confirmation of the foregoing tectonic preconditions. Results of the latest regional seismic data, processed on a Sayber computer, made possible the first tracings of the ancient Volga valley from Late Cretaceous-Neogene times. The topography of the valley, which is situated above the fault zone, is distinctly depicted in the dynamically delineated seismic horizons at depths of 2 to 3 kilometers (Figure 2).

Figure 2



Key: Time section of Central Caspian seismic profile

P-T, J₁, K₂: Permian-Triassic surfaces, Jurassic and Cretaceous deposits

Pg-N: Paleogene-Neogene terrigenous deposits and filled paleo-Volga valleys

Judging by the nature of the seismic data, it can be assumed that the valley, for most of its length, had a wide (5 to 20 km) accumulative terrace and a gently sloping channel profile, conducive to good grading of detrital material. It is filled with 200- to 600-meter-thick Miocene- and Pliocene-age formations. On the structural maps drawn for the SG-III and SG-II seismic strata which are, respectively, confined to the Cretaceous and Neogene deposits, the river-bed of the paleo-Volga acts as a huge hand-shaped lithologic trap, extending a great distance (up to 200 km) to the platform area of the Central Caspian. Like Mexican Canyon, it may be a regional zone of oil and gas accumulation.

Due to the absence, to date, of seismic data on the southernmost explored region, it is difficult to tell the location and nature of the Paleo-Volga estuarine areas. However, results of paleo-tectonic analysis lend credence to the idea of the north-to-south migration of the Paleo-Volga during Jurassic-Cretaceous and Neogene times. If the headwaters of the Paleo-Volga were located on the Russian plain, then the estuarine areas, that is, the basins into which the paleo-valley discharged, were found within the Southern Caspian megabasin.

Based on lithologic, facial, and paleotectonic features of Mesocenozoic deposits, we assume there was a delta (valley) of the paleo-Samur and the paleo-Kura in the west during Mesozoic time, and of the paleo-Amu Darya in the east during Pliocene time.

Results of geophysical investigations indicate the absence, of a sedimentary mantle in the present-day structure of the Central Caspian arched uplift, and the absence of a fault delimiting the Epihercynian platform and the Alpine geosynclinal folding.

The nature of the distribution of the strata and lithofacies, the bedding depths of Mesozoic and Permo-Triassic deposits (taking into account the recognized commercial accumulations in lowland Dagestan and Kalymkia, and South Mangyshlak), points to a structural and genetic connection of these regions through the Caspian water area and to the presence of oil and gas in the region from Mesozoic and Permo-Triassic deposits primarily associated with unarched traps.

In the eastern part of the Apsheronian archipelago, the uplifts of the Apsheronian-Balkhan zone are rather distinctly traced. They are typical of the miogeosynclinal region, and by and large comprise a separate tectonic step. The latter is characterized by a reduction in the thickness of its Pliocene-Miocene-Paleogene deposits, the high hypsometric and stratigraphic levels of the folding level and its gradual attenuation to the north-east, in the direction of the Epihercynian platform.

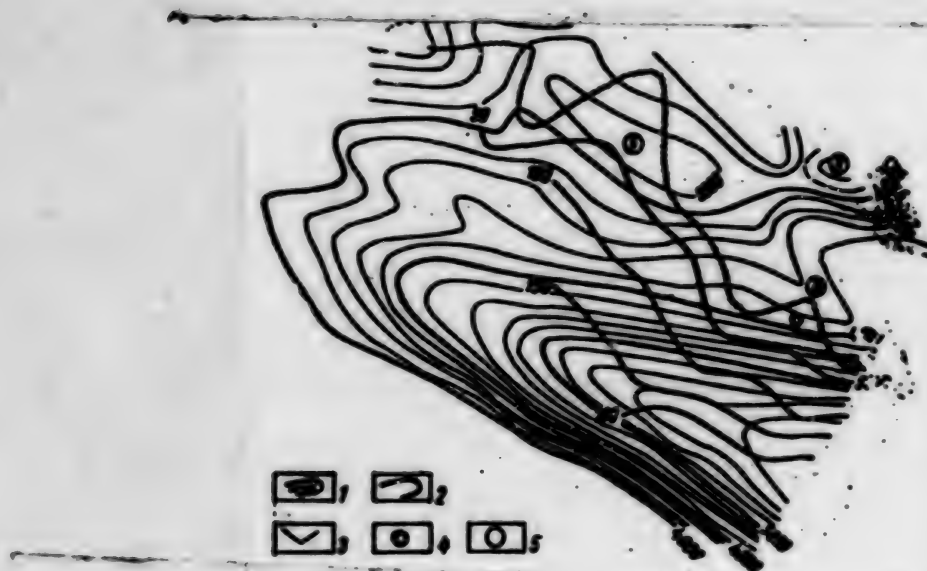
According to detailed seismic research there is, within the boundaries of the Apsheronian-Balkhan zone, a third buried anticlinal line: (Andreyev Bank--Sevindzh--imeni Nakhichevan and Gyandzhlik--imeni Yakubov--imeni Abramovich), which is separated from the K. Grigorenko--Neftyaneye Kamni--imeni 28 Aprelya anticlinal line by the broad Kusar-Kel'kor trough.

The thinning out of individual KaS horizons and the PK suite in the pay section lows, which made possible the detection of stratigraphic traps conducive for the retention of oil and gas deposits (Figure 3), are clearly defined along the north-east rim of this trough, atop the periclinal and flank sections of the buried structures.

The termination of the Dibrar gravity maximum, caused by a Mesozoic meganticline, is shown on the regional map on the eastern shore of the Apsheronian peninsula. This pinch-out zone has been detected in Middle Pliocene deposits in a definite stage, confined to the south-west slope of the ancient uplift.

According to drilling data, within the boundaries of the Apsheronian-Balkhan zone on the Apsheronian Bank, K. Grigorenko, Zhiloy Island, Artem Island, Neftyaneye Kamni, imeni 28 Aprelya and other structures, a wide distribution of KaS deposits, with commercial reservoirs of gas and oil has been established. However, Well No 1, completed on the arch of the Andreyev Bank uplift, entered the underlying (Miocene) deposits from the upper section of the KS, not having found the oil- and gas-bearing formations (KaS and PK) in the section. Nor did subsequent attempts, i.e. drilling Andreyev Bank Well No 2 to tap the KaS in more advantageous conditions, meet with success. The pinch-out zone and stratigraphic traps in the water area under consideration were found thanks only to comprehensive seismographic exploration operations. Farther to the northwest, in the

Figure 3



Key: Structural map of pay section lows

1. Isometric lines along SG-III (Pay Section lows)
2. Iso-pachous lines of thinning-out bands
3. Pinch-out line
4. Recommended well
5. Uplifts
- I imeni Dzh. Nakhichevanskogo
- II Mayskoe
- III Nose

Apsheronian Bank-Kamni Dva Brata region, we note that as goes the regional, so goes the local thinning of the Pliocene and Miocene-Oligocene deposits. Here atop the Mesozoic bed we note a juxtaposition of Miocene-Oligocene strata unconformably overlapped by Pliocene deposits, and characterized on the seismic profiles by distinctly delineated horizons. The presence of lithologic and stratigraphic traps, distinguishable on the wave field by their specific features, is not ruled out here.

In the eastern water area, within the boundaries of the Kara Bogaz and Peschanomysskaya arches, the regional nature of the change in thickness of the Meso-Cenozoic deposit system has been studied. Pinch-out zones from individual stages in the Miocene-Oligocene-Pliocene deposits have been plotted. In the Turkmen shelf large buried Mesozoic vault-shaped uplifts (the Priogurchinskaya and Ul'sko-Okaremskaya) have been detected. They are distinguishable by sub-meridional favorable gravimetric anomalies, and can be considered as oil and gas accumulation zones.

The presence of structures similar to the Muradkhanlin field in the Prikurin region of Azerbaijan is possible here, where Eocene terrigenous-carbonaceous strata immediately cover Mesozoic uplifts of erosional-volcanic origin. The similarity of the geophysical (gravitational, magnetic and seismic) fields of the Prikurinskaya and Southern Caspian regions (foldings), their distribution in the regional map in a united intermontane trough and the similarity of their history of geological development in the Middle Cenozoic time can be used to support our proposal.

According to seismic data, on separate shore areas of Turkmenia (Okarem and Western Ogurchin) and Mangyshlak (Kosa Ada and Rakushechnaya-more) there are obliquely laminated deposits of a Paleogene-Cretaceous system, probably resulting from reefs, which have been plotted fairly distinctly at depths of 500 to 1000 meters.

In connection with the commercial oil and gas presence in the Mangyshlak deposits, and in the adjacent water area, there is an urgent need to conduct combined geological and geophysical investigations to search for lithologic and stratigraphic traps, zones which are conducive to hydrocarbon accumulation. We must plan to carry out exploratory and prospecting drilling to determine the oil and gas content of nonanticlinal traps lying at the minor depths of 500 to 3000 meters.

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CSO: 1822/392

OIL AND GAS

USE OF SCIENCE, TECHNOLOGY IN AZERBAIJAN OIL RECOVERY TOLD

Baku AZERBAYDZHANSKOYE NEFTYANSKOYE KHOZYAYSTVO in Russian No 2, Feb 84 pp 9-14

[Article by A. I. Lyatifov, chief engineer of p/o Azneft': "The Achievements of Science and Technology in the National Economy---the P/O Azneft' [State Production Association of the Azerbaijan Oil Industry"]

[Text] Work on scientific and technical progress is being done in the p/o Azneft' in the areas of the development of oil and gas fields, the drilling of wells, equipment for and the technology of recovering oil and gas, increase in formation productivity, the mechanization and automation of production, and so on.

Each year tens of scientific and technical measures that help in production-plan fulfillment are introduced. The most important of them are coordinated and financed and rewarded with material incentives by plans of the USSR Council of Ministers, the p/o Azneft', specific integrated scientific and technical programs, and programs for solving the most important scientific and technical problems. Moreover, the association, jointly with scientific-research institutes---those of the industry, of Azerbaijan SSR Academy of Sciences and of other ministries and agencies, is creating and introducing new equipment and advanced technology on the basis of orders, job authorizations and economic agreements. These planning documents covered 54 measures in 1983.

Indicators of the fulfillment of plans for introducing new equipment in accordance with measures approved by the USSR Council of Ministers and Minnefteprom [Ministry of Petroleum Industry], and also the economic effectiveness achieved by the use of them during 1981-1983, are shown in table 1.

Nonfulfillment of the plan in 1982 is explained by the nondelivery of UPT-1-50 installations, caustic soda and the ESM-4 miniprocessor in the established amounts, despite all the steps taken by p.o Azneft'.

Table 1

| Years | Number of measures | | Economic effectiveness, thousands of rubles |
|-------|-----------------------|--------|---------------------------------------------|
| | According to the plan | Actual | |
| 1981 | 16 | 16 | 2,456 |
| 1982 | 15 | 12 | 2,200 |
| 1983 | 18 | 17 | 2,500 |

Of the measures introduced that were approved by the USSR Council of Ministers and Minnefteprom for the 11th Five-Year Plan, the most effective ones

were new methods for increasing formation productivity, the drilling of wells with the use of GN, GNU and GAU series bits with sealed bearings, the drilling of wells with the use of low-rpm downhole motors that have rpm's of less than 250 rpm, inhibitors for preventing salt deposition, the UPT-1-50 well-repair installation, which is based on the T-130 tractor, screw compressors for gathering and utilizing casing-head gas, and so on.

In 1981-1983 the association's new-technology plan included basically developments by AzNIPIneft' [Azerbaijan Scientific Research and Design Institute for the Oil Industry], VNIIneft' [All-Union Oil and Gas Scientific-Research Institute], and Azerbaijan AN [Academy of Sciences] institutes. Each year their number reaches 20-25.

According to the State Plan for Developing Science and Technology, the basic indicators for the technical level of production in the oil industry are the recovery of oil through the use of new methods for increasing formation productivity, the level of use of casing-head gas, the share of oil recovery at automated oilfield facilities, specific servicing-personnel manning per well (of the active inventory) operated, time spent on the operating cycle--from the start of construction of a producer to its turnover for operation, and net effective speed during exploration drilling. All the association's basic production indicators are being fulfilled and overfulfilled, except for net effective drilling speed at exploration wells. In 1982 the net effective speed was 187.2 versus the planned 210.0 m/st.-mes [meters/rig-month], and in 1983 it was 213.1 versus the planned 230 m/st.-mes. Nonfulfillment of net effective drilling speed during exploration is explained basically by accidents, organizational idle time and work defects.

In 1983 p/o Azneft' participated in performing five tasks for specific integrated scientific and technical programs of O. Ts. 004, "The Creation and Wide Use of a Set of Methods and Technical Resources for Increasing Formation Productivity to 55-60 Percent, and Intensification in the Development of Oil-fields," and O. Ts. 005, "The Creation and Mastery of Technological Processes and of Technical Equipment for Drilling Oil and Gas Wells with a Speed That Exceeds That Achieved 2-Fold to 3-Fold."

Indicators of fulfillment of the goals of the specific integrated scientific and technical programs are shown in table 2.

In 1982 the task of injecting alkali into formations was not carried out because of undershipment of caustic soda by the manufacturing plant. Although the oil recovered through wet in-situ combustion in 1983 was less than the amount set by the task, this shortfall was more than compensated for by oil recovered under other new methods for increasing formation productivity.

Table 2

| Year | Number of tasks | |
|------|----------------------|-------------|
| | Assigned by the plan | Carried out |
| 1981 | 1 | 1 |
| 1982 | 4 | 3 |
| 1983 | 5 | 4 |

With a view to speeding up scientific and technical progress and increasing the incentives for enterprises and organizations to introduce the newest scientific and technical achievements, in 1982 Minnefteprom scientific-research

and design-development organizations and enterprises converted to the cost-accounting system for organizing the work of creating, assimilating and introducing new equipment on the basis of job orders and authorizations. This measure stirred up considerably institute and enterprise work on creating and introducing new equipment, and it helped to raise production effectiveness.

Thus, in 1981 the economic effectiveness of developments by the industry's institutes was 1.5 million rubles in the association, in 1982 it was 3.2 million rubles from AzNIPIneft' developments alone, and, in 1983, 32 developments were introduced with an economic benefit of 4.3 million rubles.

Azneft' Association is recruiting the forces of outside scientific-research institutes, design-development organizations and vuzes for the solution of production problems.

Thus, in collaboration with Azerbaijan SSR Academy of Sciences scientists, problems of increasing formation productivity, of prospecting for and exploring new fields, and of raising the stability and quality of operating equipment are being solved. Such work as the development of corrosion-resistant sealers for drilling pumps, of plastics to replace metal components in well-head equipment, of means for protecting equipment from the harmful effects of hydrogen sulfide, and so on, should be noted.

The UkSSR AN's Institute of Superhard Materials developed and manufactured an improved design for the ISM-type cutter head, for taking cores in the Saatly superdeep-well environment.

The OKB [Special Design Office] for Rodfree Oil-Well Pumps of Minkhimneftemash [Ministry of Chemical and Petroleum Machine Building] is perfecting the design of submerged electrical pumps for the conditions of Azerbaijan and other places. AzINEFTEKHIM [Azerbaijan Petrochemical Institute] imeni M. Azizbekov is developing measures for raising greatly the formation productivity of water-encroached and poorly productive formations, based upon the use of viscoelastic systems. In all, 15 institutes and design bureaus are performing annually 24-30 scientific-technical operations worth up to 500,000 rubles.

Cases of nonfulfillment of state and agency plans for introducing new equipment occur. Thus, in 1983 the Gobustan URB [exploratory drilling administration] drilled only 1,900 meters of the 10,000 meters of the established plan for penetration, using highly efficient GN, GNU and GAU series bits. In 1983, the Apsheron UBR [drilling administration] failed the Minnefteprom task for drilling wells by electric drill, falling short of the plan by about 5,000 meters.

With 1984, in accordance with a CPSU Central Committee and USSR Council of Ministers decree, the fulfillment of plans and tasks for developing science and technology is among the basic indicators by which the results of economic activity of associations and enterprises primarily will be evaluated and the results of socialist competition summarized.

The association, in drawing up plans for new equipment, which often consisted of measures that were not distinguished by innovation and high technical and economic yield, tolerated formalism. Such phenomena will be excluded this year.

P/o Azneft is doing definite work in the area of raising output quality. Thanks to the introduction of a large number of measures, the quality of crude turned over has risen greatly. In 1983, in comparison with the first year of the 11th Five-Year Plan, the amount of substandard crude was greatly reduced—it was only 0.3 percent of all crude turned over. In 1983, 58.5 percent of the crude turned over was in the first quality group, 3 percent more than in 1982. For the association as a whole, 98.6 percent of all the crude turned over in 1983 was in the first and second quality groups, which is 0.8 percent more than in 1982. In 1983 the introduction of an integrated system for monitoring the quality of work and of output in all NGDU's [oil and gas recovery administrations] was completed.

The Azneft' Association successfully completed the plan for oil recovery in 1982-1983. The introduction of new equipment, advanced technology and the developments of AzNIPIneft' and other institutes of the industry also helped here.

One of the main directions for scientific and technical progress in recovering oil were operations in the area of increasing formation productivity that the association has been performing for the past 10 years.

By using new methods for increasing formation productivity, additional oil recovery for the association as a whole was 92,000 tons (or 2 percent of total oil recovery) in 1981 versus the task of 65,000 tons, 107,500 tons (2.3 percent) in 1982 versus the task of 70,000 tons, and 125,000 tons (2.9 percent) in 1983 versus the task of 100,000 tons. The economic effectiveness of using the new methods is about 2.6 million tons per year.

New methods for increasing formation productivity, meanwhile, are being used on a limited scale. Not all of them have been adequately studied and tested, and, the main thing, not all of them are acceptable under specific conditions from the economic point of view. Most methods require substantial capital investment for additional recovery of the crude.

It was planned to complete in 1984 the buildup of facilities for in-situ combustion at the Khorasany (NGDU Leninneft') and Umbaki (NGDU Karadagneft') areas, to inject microfoam solutions into the Sianshor field, to master the UPVV-12 installation for treating highly mineralized water, to begin the buildup of facilities for injecting steam into the formation at the Binagady field (the NGDU Kirovneft'), and, in 1985, to complete the construction of alkaline waterflooding at the Kyurovdag field (NGDU Shirvanneft'). In the long term, introduction of the following facilities into operation is called for: steam injection at the Kyurdakhany field (NGDU Leninneft'), in-situ combustion at the Chakhnaglyar field (NGDU Kirovneft'), the injection of hydrocarbon gas under high pressure at the Kyursangy field (the NGDU Sal'yanneft'), and so on.

As a result of realization of the indicated measures, additional oil recovery by new methods will increase from 2.3 percent of total recovery in 1982 to 4 percent in 1985.

Successful completion of the building of all facilities by the new methods for increasing formation productivity depends mainly upon precise work by

Azneftestroy [Trust for the Construction of Azerbaijan Oilfield Facilities], which is the sole contracting organization that does construction work in the area of introducing new technological processes.

Industrialized methods are being introduced slowly into construction work, a fact that tells sharply on the pace of building up the facilities called for by the state capital-investment plan and prolongs the time spent completing them. Thus, introduction into operation of the experimental production base for AzNIPIneft', which has been under construction for about 10 years, is being stretched out without authorization. Yet this facility will help in the scientific and technical development of p/o Azneft' enterprises.

In 1983, out of 44 Azneftestroy Trust construction brigades, only 5 had converted to the brigade contract. During 1983 the plan for construction commodity output was carried out by 17.3 million rubles versus the required 20.3 million. The trust's management should sharply improve the organization of construction work and pay special attention to concentrating forces and resources on the facilities due for early startup and to providing for the most rapid introduction into operation and assimilation of new production capacity.

In the area of oil-recovery technology, the developments being introduced cover methods for stimulating the bottom-hole zone of wells, an increase in the MRP [time between repairs] of wells, reduction in the frequency and duration of current maintenance, prevention of the corrosion of underground equipment and of salt deposition in the production string, and the saving of materials, fuel and power.

However, there are a number of problems that require specific solution by scientific research and specialized design-development organizations:

the methods used for strengthening the bottom-hole zone in order to prevent sanding up in producing wells (the injection of large-grain sand, sand-cement and foam-cement muds, resins and raw phenols, Kontarena-1 and others) are not effective enough. The creation of stable filters against sanding up is required. Moreover, the development of an effective formula and of a technology for strengthening the shell of the formation which will provide for high liquid filtration and high strength is necessary; and

a sharp increase in lengthening the periods between the servicing of wells has not been achieved. For the association as a whole, the MRP of wells does not exceed 50 days.

AzNIPIneft', which should, when it plans scientific-research and experimental design development, concentrate efforts and resources on developments that will be on a par with the world in technical and economic indicators, play a major role in solving the indicated problems.

Among the basic tasks for 1984 and ensuing years are those of raising the level of mechanization of operations and reducing manual labor during underground servicing and overhaul. For this purpose, reequipping with new mobile UPT-1-50 and UPT-1-32 type installations must be accelerated. Moreover, deliveries of APR-2VB automatic devices for screwing and unscrewing the NKT [tubing] during round-trip operations must be increased.

The reduction of manual labor is a major reserve for increasing labor productivity in recovery, drilling, construction and auxiliary production processes. The number of workers who are performing labor by the completely mechanized method is 63.43 percent in basic production, and in auxiliary production it is much less. The Azerbaijan Communist Party Central Committee recently adopted a decision to develop a special integrated program for increasing labor productivity in the industry, based upon the wide introduction of the achievements of scientific and technical progress. The most active participation in developing and realizing this program must be adopted in order that it may start to operate and bring practical results as soon as possible.

Constant improvement of equipment and technology throughout the entire work cycle is required in the area of building wells in p/o Azneft'.

Such scientific and technical achievements as low-rpm downhole motors, GN, GNU and GAU series drill bits, BU-75 rigs for faster drilling to shallow depths, TBVK-type drill pipe with stabilizing collar, light-alloy aluminum pipe, OTGM- and OG-type casing, technological regulations for sinking complicated wells, regulations that provide for a reduction in the density of the drilling mud, elastic stabilizers, rotating supports for preventing sticking of the drilling tool, and so on, have been introduced successfully in recent years in this area.

These and other measures have helped to increase penetration (327,400 meters in 1980, 403,000 in 1983) and to raise the net effective drilling speed in exploration drilling (201 meters/rig-month in 1980, 213 in 1983).

However, it should be noted that the measures being introduced for new equipment, technology and work organization have not exerted due influence on the fulfillment of plan tasks in the area of well construction as a whole throughout p/o Azneft'.

In 1982-1983 plans for meterage for both drilling purposes were not met. In 1983 the plan for meterage was carried out by only 91.6 percent, for exploration drilling by 82.7 percent.

The task for operational-drilling speed in p/o Azneft' was carried out by only 78.8 percent. The speed achieved in operational drilling was 441.2 meters/rig-month versus the 560.0 planned. For this indicator, matters go very poorly in the Apsheron UBR (60.6 percent) and in the Ali-Bayramli UBR (76.6 percent). The plan for speed in exploration drilling also was not achieved.

It should be noted that no little blame for not fulfilling the plan for penetration and speed in building wells goes to the collectives of drilling enterprises, which had 29 accidents and large amounts of faulty work and organizational idle time in 1983.

Nevertheless, AzNIPIneft', the Baku Sections of VNIIBT [All-Union Scientific-Research Institute for Drilling Equipment] and VNIITneft' [All-Union Scientific-Research Institute for the Development and Operation of Oilfield Pipe] should intensify designers' surveillance over the introduction of their developments and systematically extend scientific and technical help to lagging drilling enterprises.

In raising the effectiveness of social production and the conversion of enterprise activity to the path of intensive development, a major role should be played by the introduction of progressive methods for organizing work, advanced experience and the dissemination of undertakings and initiatives of advanced working collectives. Although definite work has been done in this area, in 1984 and in later years the work is to be intensified and the lag in introducing progressive methods for organizing work and advanced experience eliminated in a short time.

The Gobustan URB (1 brigade out of 15), the Dzharly URB (1 out of 12) and the Kyursangy UBR (7 out of 17), the Gobustan VMK [derrick-erecting combine] (1 out of 6) and the Siazan UBR (4 out of 8) lag in converting to the brigade contract.

Introduction into the NGDU's of Azizbekovneft' and Ordzhonikidzeneft' and other organizations of the work experience in the system for pay without job order that has been gained by underground well-repair brigades of the NGDU Arlanneft' of the Bashneft' Association has given positive results. However, up to now only 174 out of 277 underground well-repair brigades in p/o Azneft' have come under the indicated pay system.

The NGDU's imeni 26 bakinskikh komissarov and Leninneft', which have converted to this system, respectively, 3 brigades out of 32, and 34 brigades out of 67, lag badly in this matter.

Definite work is being done now in p/o Azneft' in the area of inventiveness and rationalizing. The main attention is being paid to energizing worker creativity and purposefulness in solving the main technical production tasks. For this purpose, enterprises and organizations are participating in socialist competition under the slogan, "Better Enterprise Inventiveness and Rationalizing," in the All-Union socialist competition of the collectives of Minnefteprom enterprises and organizations for achieving the best indicators, and in the inspection-type contest for best youth specialists in the area of rationalizing and inventiveness. Each year an annotated list of the best rationalizer suggestions is published, a subject reference list for 1982-1985 has been compiled, and so on.

All this has enabled the association's rationalizers and inventors to undertake socialist commitments during the 11th Five-Year Plan--to obtain 14 million rubles in savings from the use of rationalizers' suggestions and inventions, that is, 1 million rubles more than under the 10th Five-Year Plan.

During 1981-1983 savings were 9.9 million rubles, which exceeded the socialist commitment for 1981-1983 by 1.2 million rubles.

At the same time, the main enterprises of p/o Azneft' are not paying enough attention to the introduction of highly effective inventions, and the percent of coverage of suggestions by calculation of economic effectiveness remains low (30 percent).

Enterprise and organization collectives will be developing in 1984 and in later years organizational-technical measures that call for:

a rise in the responsibility of laboring collectives for the timely fulfillment of plans for the development of science and technology and for the introduction of progressive technology, mechanization and automation of production processes, tasks for specific integrated scientific and technical programs, and programs for solving scientific and technical problems;

fulfillment of the main indicators for the technical level of production, which help to increase productivity and reduce prime production costs;

reduction of the norms for the consumption of fuel, power and raw and other materials;

provisioning for the fulfillment of tasks for introducing progressive methods for organizing work and advanced experience and for disseminating undertakings and initiatives of advanced laboring collectives of Minnefteprom and the p/o Azneft'; and

intensification of the work to provide for the timely and wide introduction of inventions and rationalizers' suggestions, especially in the area of urgent production problems.

AzNIPIneft', AzINmash [Azerbaijan Scientific-Research Institute for Petroleum Machinebuilding] and IPGNGM [Institute of Problems of Deep Oil and Gas Fields] of the Azerbaijan SSR Academy of Sciences, OKBneftemash [Special Design Bureau for Oil Machinery] and the Baku Sections of VNIIBT and VNIITneft' must concentrate efforts on solving the most urgent problems of the republic's oil industry.

P/o Azneft workers are filled with resolve to devote all their efforts, ability and organizational capabilities to increasing production effectiveness and to converting the economic activities of enterprises to the path of intensive development.

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CSO: 1822/289

OIL AND GAS

USE OF SCIENCE, TECHNOLOGY IN AZERBAIJAN'S OIL REFINING TOLD

Baku AZERBAYDZHANSKOYE NEFTYANSKOYE KHOZYAYSTVO in Russian No 2, Feb 84 pp 18-21

[Article by A. F. Efendiyev, deputy minister of Azerbaijan SSR Minneftekhim: "The Achievements of Science and Technology in the National Economy--the Minneftekhimprom Azerb. SSR [Ministry of Petroleum Refining and Petrochemical Industry of the Azerbaijan SSR]"

[Text] The CPSU Central Committee and USSR Council of Ministers Decree, "Measures for Accelerating Scientific and Technical Progress in the National Economy," defined concrete tasks for planning organs, academic and industry institutes, ministries and agencies, and party, trade-union and Komsomol organizations on accelerating scientific and technical progress in the national economy.

The integrated program of introducing scientific and technical achievements in the Azerbaijan SSR Minneftekhimprom is being implemented by radical restructuring of the oil-refining industry.

During the 10th Five-Year Plan and the first 3 years of the 11th, two highly productive ELOU-AVT's [electrical atmospheric-vacuum pipestill desalination installations] for the primary refining of crude; installations for the catalytic reforming and hydrofining of oils; and commodity bases for railroad-car filling with white products at the Gyuzdek Railroad Yard and for maritime loading at the Dyubendy port were built and put into operation.

The introduction of these processes enabled oil refining to be concentrated basically at the NBNZ [Novyy Baku Oil Refinery] imeni Vladimir Il'ich and the BNZ [Baku Oil Refinery] imeni 22d CPSU Congress.

Introduction of the two ELOU-AVT installations enabled the refining of arriving sulfurous crudes to be organized and, thereby, the shortage of feedstock to be alleviated and low-capacity installations for the primary refining of crude that are obsolescent or worn out to be shut down.

The refineries' technical and economic indicators have been raised greatly by increasing the output of white product, improvement in the quality of the output produced, and reduction in energy consumption per ton of refined crude.

Introduction at the BNZ imeni 22d CPSU Congress of an installation for hydrofining oils has enabled the obsolete process of acid-contact refining, with an effluent of acidic sludge and spent clay that is difficult to make use of, to be eliminated, which is important in increasing the effectiveness and sophistication of production and in improving the sanitation of production work and of the environment, and the quality of the base oils to be improved, and the output of oily components to be increased by 4.5-5 percent.

A saving of material resources (8,000 tons of sulfuric acid and 40,000 tons of bleaching clay annually) was provided for, and expenditures on transporting reactants and their wastes have been reduced. The economic benefit from introducing oil hydrofining was more than 2.0 million rubles.

A complex for catalytic reforming of gasolines at the NBNZ imeni Vladimir Il'ich was put into operation in the concluding year of the 10th Five-Year Plan. The process was assimilated ahead of schedule, with an annual economic benefit of 7.98 million rubles, during the first year of operation.

The technical level of the automotive gasolines being produced has been raised greatly and they are now being certified as of the highest quality category. The output of ethylated automotive gasolines has been sharply cut.

Along with the introduction of large-capacity units, technical progress in the republic's existing oil-refining industry base is being made by rebuilding and reequipping existing production facilities. Much purposeful work is being done in this area.

With a view to intensifying the process of deasphalting sludge, installations were rebuilt with a 30-percent increase in capacity. The condensation-cooling systems of these installations were replaced by effective air-cooling equipment.

The quality of the base motor oils being produced, particularly in such a most important indicator as the viscosity index, depends greatly upon the operation of selective-refining installations.

Obsolete equipment was modernized during 1981-1982 on the basis of new, highly productive equipment at installations for the selective refining of oils, greatly reducing losses of the scarce solvent furfural (a saving of 200,000 rubles).

A scheme for two-step extraction has now been prepared that will enable the more complete extraction of polycyclic aromatic hydrocarbons and, thereby, improvement in the quality of the base oils.

A most important reserve for accelerating scientific and technical progress in the area of intensifying the refining of crude is that of raising the effectiveness of the secondary processes of oil refining, the basic ones of which are those of catalytic cracking.

In 1981 the gas-compressor station of the installation for the catalytic cracking of light feedstock was rebuilt, with the introduction into operation

of modern centrifugal turbocompressors instead of the obsolete, low-powered gas-motor compressors. As a result, productivity in terms of raw material increased by 8-10 percent, and working conditions were improved for servicing personnel.

The conversion of two existing catalytic-cracking installations for light feedstock, based on zeolite-containing catalysts, has enabled stabilized aviation gasoline output to be increased by 4-5 percent and, simultaneously, the octane characteristics of the aviation gasolines to be raised by 2 points.

A great amount of work has been done to intensify the work of installations for the catalytic cracking of heavy feedstocks, the most important of which are:

the reconstruction of one of two installations under a two-stage cracking scheme based upon microspheroidal catalysts (output of automotive gasoline components increased by 2 percent, and the annual economic benefit was 512,000 rubles); and

the reconstruction of dust-trapping systems, which permitted catalyst-dust discharges into the atmosphere to be reduced and about 130 tons of catalyst saved.

In 1983 reconstruction was completed on one of the catalytic-cracking installations at which a one-stage process for obtaining nonethylated gasoline will be assimilated. This technology, which is being implemented for the first time in the USSR, is an industrial test for perfecting and disseminating advanced experience. An annual economic benefit of more than 0.5 million rubles is expected. Work was performed on the reconstruction of a vacuum-creating system at an installation for the vacuum distillation of mazut, which has been reflected in an improvement in the quality of feedstock for coking, and the transport system for the delayed-coking installation was improved.

The results obtained from operating this installation are the best in the USSR Minneftekhimprom system.

As a result of the measures taken, the technical level of Azerbaijan's oil refining is now characterized by the following indicators: more than half of the crude is subjected to desalination and is refined at modern installations of high unit capacity, and the production of nonethylated gasolines with octane numbers of 76 points or higher is almost 90 percent of the total automotive gasoline produced.

Of all the diesel fuel produced, 34 percent is sent for export, and 15 percent is produced with a sulfur content (by weight) of no more than 0.2 percent.

According to 1983 results, 33 of 96 petroleum product items are produced with the State Emblem of Quality. Among them are aviation and automotive gasolines, diesel fuel (export), marine fuel oil, five brands of oils, and so on. All remaining products are produced in the first quality category. Since 1980, items of the second quality category have been completely removed from production.

As a result of the work done, the share of product with the State Emblem of Quality for 1983 was 45.8 percent, and products worth 34.5 million rubles were produced above the plan.

In 1983 water consumption was cut by 34.8 percent and discharges into the atmosphere were reduced by 30.0 percent in comparison with 1980.

In order to speed up scientific and technical progress in the industry and to improve the production base, and later, its development, ministry enterprises did work that involved the scientific forces of research institutes of the Azerbaijan SSR AN [Academy of Sciences], vuzes, and prime and industry institutes of union ministries on the basis of economic settlements. More than 1 million rubles are allocated annually for the execution of NIR [scientific research].

Most important for raising the industry's technical level are operations to improve catalytic cracking processes and the production of oils, additives and catalysts and to create automated control systems. For the ministry as a whole, 3.3 million rubles were spent for these purposes in 1980-1982, for an economic benefit of 4.5 million rubles.

Based upon research data of INKhP [Institute of New Chemical Problems] of the Azerbaijan SSR AN, the production of automotive oils made from Sangachaly crude has permitted the oils' viscosity index to be raised greatly and their operational qualities to be improved, and the additive IKhP-388, which was developed by IKhP [Institute of Chemical Additives] of Azerbaijan SSR AN, will enable the viscosity index to be brought up to GOST [State All-Union Standards] requirements.

With a view to raising production effectiveness, intensifying the refining of crude and improving the quality of output, scientific-research institutes have developed recommendations on further development of the branch for the long term: the conversion of 1-A/1-M catalytic-cracking installations to an improved zeolite-containing catalyst, the introduction of the dearomatization of gasoil, viscosity-breaking of oil tar from sulfurous crudes, the construction of installations for kerosene and diesel-fuel hydrofining, the construction of installations that will provide for the output of high-quality group-V motor oils based upon refining of paraffinous crudes and with the involvement of highly effective additives (IKhP-21 and IKhP-388).

OASU [system for automated control of a branch of the economy] has been introduced in Azerbaijan SSR Minneftekhimprom. Since it includes more than 90 tasks of planning and current control, calculation and reporting, it will help to improve control of the industry. Moreover, an integrated system that provides ministry sections and management with real-time and reference-file information about the production of output with the Emblem of Quality and about the shipment of crude feedstock has been introduced.

ASU's [automated control systems] of the NBNZ imeni Vladimir Il'ich and the BNZ imeni 22d CPSU Congress, as well as ASUTP's for ELOU-AVT installations Nos 16 and 15 and for installations for alkylation and urea dewaxing, are being operated at the ministry's enterprises.

Before the end of the 11th Five-Year Plan it is planned to introduce ASUPT for the integrated hydrofining of oils and of ELOU-AVT-6 at BNZ imeni 22d CPSU Congress.

Inventiveness and rationalization are making a major contribution to raising production effectiveness. During the 11th Five-Year Plan, 4,796 rationalizers' suggestions and 93 inventions were introduced for a total economic benefit of 9.6 million rubles.

The decisions of the Azerbaijan Communist Party Central Committee Plenum of December 1983 noted the necessity for work on realizing existing All-Union, republic, industrywide and regionwide scientific and technical programs and on forming new ones, paying special attention to developing programs for increasing labor productivity.

A program for reducing the use of manual labor was among the integrated specific programs for the most important socio-economic problems during the 11th Five-Year Plan.

Introduction of the organizational and technical measures for this program should provide by the end of the five-year plan for a 21-percent reduction in worker manpower engaged in manual labor, and this factor should provide a 2.7-percent rise in labor productivity. During the first 2 years of the 11th Five-Year Plan and the first half of 1983, 53 measures for the mechanization and automation of manual labor were introduced at the ministry's enterprises, for an economic benefit of 77,300 rubles.

Inadequate ministry work in the capital-construction area should be noted. Thus, during the first 3 years of the five-year plan, there was an assimilation shortfall of 27.88 million rubles in regard to the construction of facilities for the rebuilding of enterprises and of 5.73 million rubles in regard to the construction of facilities for reequipping with machinery. Therefore, the first-priority task of Azerbaijan SSR Minneftekhimprom is to speed up the introduction of the achievements of scientific and technical progress in capital construction and the erection of facilities for reequipping with machinery. IKhP and INKhP of AzSSR AN are doing much work to raise the quality of oils produced at the ministry's enterprises. A program for the construction of oil-production installations, the execution of which will enable motor-oil quality to be brought up to GOST requirements, has been developed.

By the end of the 11th Five-Year Plan, based upon scientific and technical progress and wide introduction of modern equipment and technology, it is necessary to intensify the refining of sulfurous crude, to increase the output of white products, to improve the quality of the output produced, to put into operation a complex for producing electrode coke, to assimilate the process of obtaining unethylated high-octane gasoline at catalytic-cracking units, to master the production of the new catalyst, and to put ASUTP into production. The execution of what has been contemplated will enable the severity of the refining of crude to be brought up to 60 percent, and more than half of the output to be produced in the highest quality category.

There is no doubt that the republic's oil refiners, true to their labor traditions, will devote all their efforts to fulfilling the program for developing the industry, based upon the achievements of scientific and technical progress.

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COAL

MINISTRY OFFICIAL RESPONDS TO ARTICLE ON MACHINERY DEVELOPMENT

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 2 Jun 84 p 2

[Unsigned article: "The Way to the Face: The Paper Spoke, What Has Been Done?"]

[Text] In recent years the coal industry has received large investments, nevertheless, its work is still quite strained. The problem is that coal extraction conditions have become more difficult. Miners must go down to greater depths, work thin seams less than 1 meter thick and work horizons with high rock pressure and the danger of gas blow-outs. Reliable, highly productive equipment is required to counteract these difficulties. Unfortunately, its production volumes still lag behind plans. This was discussed in this paper on 15, 16, and 17 December 1983 in the articles: "The Way to the Face."

The USSR Ministry of the Coal industry considered the article and acknowledges that its criticisms are correct. So reported V. Nikitin, first deputy minister. In order to eliminate shortcomings in the development, production and introduction of new technology, a decision was passed concerning the modernization of machinery and the removal of obsolete equipment from production, in accordance with the recommendations of the GKNT [State Committee on Science and Technology]. As early as 1985, the Soyuzuglemash [Union Coal Machinery] and Soyuzugleavtomatiki [Union Coal Automation] Plants plan to have more than 30 percent of their output earn the Mark of Quality. The production of highly productive and reliable coal combines for operation in difficult mining geological conditions is being mastered.

In order to refine the designs of machinery being transferred to series production, an order by Minister B. Bratchenko provides for the mandatory manufacture of experimental models and the testing under maximum parameter operating conditions.

The ministry is also taking measures to improve the use of production capacity at coal machinery building plants. This year this indicator should reach 93 percent, compared to 89 percent last year. By the five-year plan's end it is intended to increase the shift coefficient through better supply of work places with materials and tools, increases in the number of workers serving more than one machine tool and the broader use of the brigade form of work organization.

The implementation of these plans will, by the end of the five-year plan, give miners machinery meeting new technical standards at operations producing 65 percent of total volume, base conveyors at more than 90 percent and standardized block belt conveyors at 64 percent.

NEW TUNNEL DRIVING MACHINES DEVELOPED

[Kiev RABOCHAYA GAZETA in Russian 23 Mar 84 p 2]

[Article by N. Plakhin, engineer-designer, Yasinovataya Filiate of institute:
"For High Speed Underground Machines"]

[Text] So that mines can extract coal in the future as well as today, it is essential to increase the pace at which mine workings are driven. This requires constant improvements in tunnel driving technology and the creation of more powerful combines, in particular, the so-called selective action machines with boom type digging units. They are well suited to difficult mining geological conditions, are maneuverable and can easily approach areas near faces.

Unfortunately, these combines can only be used where the rock is not too hard.

We suggested a different way of expanding their use: the development of a stronger cutting tool, improvements in cutting conditions and the introduction of programmed control for working the faces. However, all this is possible only if there are improvements in combine stability at faces. This was undertaken by a creative group at the Combine Department of the Yasinovatskaya Filiate of the Scientific-Research Institute. The group was led by V. K. Vasil'chenko, a chief designer.

The research is now completed. A device has been found which improves machine reliability. According to preliminary calculations, the savings from its use will amount to 6,000 - 7,000 rubles annually. During this time Yasinovataya machine builders alone will send miners about 100 tunnel driving combines, which are more reliable in automatic operation, considerably improving their productivity. The trial models of the machines with experimental devices will start undergoing tests at the Mine imeni Stakhanov, Krasnoarmeyskugol' Association.

Simultaneously, a rigid version of the future boom has been developed. This will expand the range of rock strength in which the combines can be used.

V. K. Vasil'chenko explains: "These innovations are only part of the work to create new selective action tunnel driving machines. As you know, the well recommended and now widely used 4PP-2 combines are already obsolete.

Incidentally, the designer group led by V. K. Vasil'chenko is already developing an automated tunnel driving complex. Next year it is intended to test an experimental model of the first such complex.

COAL

KAZAKH GEOLOGICAL EXPLORATION RESULTS REPORTED

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 13 May 84 p 1]

[Article by V. Stupak, correspondent: "Towards an Underground Treasure"]

[Text] "Ten years ago, the huge ore basin from which the Maykainzoloto [Maykain Gold] Combine extracted copper, zinc, barite and other metals for more than 30 years, ran out. We had to move to another deposit which was poorer and less promising."

"Now we are happy." said Aleksandr Nikolayevich Tarin, the chief geologist of the Maykain geological exploration expedition. "Two ore deposits which will improve the combine's productivity have been discovered in the southern part of the oblast."

One of the largest expeditions in Kazakhstan is conducting a threefold search: for ore for metallurgy, coal for the Ekibastuz Basin and nonmetallic materials for all enterprises and projects in the territorial production complex.

In order to handle this large task, in a single season the Maykain geologists had to drill 20,000 and more meters of exploratory holes, and study hundreds of samples taken from the depths of the earth. They had to work rapidly, accurately and economically. The experienced expedition collective, numbering 500 people, is succeeding in this to a considerable degree. Last year the Maykain explorers were the country's best for all indicators and for three quarters in a row won the Red Challenge Banner of the USSR Ministry of Geology and the Central Committee of the sector's trade union. The brigades of drilling foremen Ya. Peters, N. Rokul' and K. Kunulekov broke season records for productivity. For example, Yakov Yakovlevich Peters' collective has already finished the five-year plan. The progressive drillers of Kuspek Nurmagambetov, Serik Altayev and Nikolay Prokopenko are close to this mark. This means that ore to be explored tomorrow is to be found and put on territorial production complex reserves today. Here is an example.

As is known, the southwestern part of Pavlodar Oblast is rich in more than Ekibastuz coal. Last season, right after completing exploration and making preparations for the approval of Sarykol'skoye field fuel reserves, where the easily extracted, low ash content coals of the Maykyubinskiy Brown Coal Basin were discovered there was suddenly an unsuspected joy. The young, and frankly speaking, lucky geologists Yelena Korotkova, Liliya Shitova and Valentina

Ivanova, acknowledged to be the best geological technicians in the sector, discovered a completely new field of "black gold" almost on the banks of the Irtysh, only 20 kilometers from the Kyzylkuraminskiy Sovkhoz.

A. N. Taran said: "We did not loose hope of finding coking coal in the Irtysh area. This is a reward for Pavlodar geologists."

The large amount of power engineering construction at Ekibastuz and the building of roads through Tomsk swamps to petroleum fields which Pavlodar workers are now doing require millions of cubic meters of sand, gravel and clay for bricks. Last year the Maykain geologists found 4 deposits of construction stone and 5 raw material bases for sovkhos brick plants.

In short, the search continues. Many new discoveries are ahead.

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COAL

VORKUTA MINERS ASSUME INCREASED PLANS

Moscow IZVESTIYA in Russian 21 Mar 84 p 1

[Article by A. Subbotin, director, Vorgashorskaya Mine, Vorkutaugol' Association: "Miners' Counter Plan: Miners in the Polar Region Decided to Increase Labor Productivity by 2 Percent and Reduce Production Costs by 1.1 Percent Compared to the Plan"]

[Text] To achieve more than intended and constantly move forward are traditions of the young collective at the Vorgashorskaya Mine. This was manifested with special force after the December (1983) and February (1984) CPSU Central Committee Plena. The Party's call for an additional 1 percent increase in labor productivity and a 0.5 percent decline in production costs brought miners' active support. At the initiative of communists in brigades and sections, a movement began for the approval of counter plans.

Another example is shown by leaders in competition, our front rankers. Thus, the "millionaire" section led by the engineer O. Bobrov, has an extraction target of 850,000 tons, while its counter plan is 1 million tons. Or take the sixth section. It also has a sizable longwall load — 700,000 tons. Nevertheless, the miners decided on a plan for an additional 50,000 tons of coal. This is equivalent to increasing labor productivity by 3 percent and reducing production costs by almost 2 percent compared to the plan. These goals will be attained through improvements in repair shift work, reductions in mining equipment idle time and through other measures.

When we compiled all the plans, our mine's reserves and potentials became clearer. Thus arose the Vorgashorskaya's counter plan. The collective decided to increase above plan labor productivity not by 1, but by 2 percent and reduce production costs by 1.1 percent. This means that 350,000 tons of above plan coal must be extracted and 546,000 rubles of above plan profits economies obtained.

This is not an easy task. However, the collective of arctic miners has rich experience in overcoming difficulties. A good basis for such a marked advance was made last year. Through improvements in all mine operations we first succeeded in passing the 5 million ton extraction level, 500,000 tons over the enterprise's planned capacity. For these successes in socialist competition the Vorgashorskaya collective was awarded the Red Challenge Banner of the CPSU Central Committee, the USSR Council of Ministers, the Komsomol and the AUCCTU Central Committee.

What has enabled us to previously attain such good results and to continue to do so? I would give first place to the organizational work of our specialists, technologists, section and service managers. It is directed first of all towards creating militant unified collectives at mucking and tunnel driving operations. Competition between high speed brigades and sections for extraction records and the highest tunnel driving rates led to the greatest daily loading per longwall in the Pechora Basin, more than 8,000 tons. In one month, the high speed tunnel driving brigade led by Hero of Socialist Labor A. Sakharov drove 1,172 meters of mine workings, also a record for Vorkuta.

Of course, records are not a goal in themselves. However, their attainment teaches people to work with maximum return and overcome difficulties and forges character. It is no accident that capable brigade leaders come from such collectives. Recently, N. Rozhkov, deputy to the USSR Supreme Soviet moved from A. Sakharov's brigade to lead a lagging collective.

Admittedly, there are often cases where, in the background of record achievements there are hidden, to put it mildly, average individuals, lagging workers and entire collectives. We do not have these. For example, good tunnel driving collectives each dig a half kilometer of mine workings a month. To obtain a good standing in competition they must reach 600 and more meters. Four out of 14 collectives are now doing this and not a single one of these 14 has failed to meet the target. In mucking operations, together with such "millionaire" sections as that of O. Bobrov, there are many which are used to reaching 700,000 - 800,000 tons annually. Without exception, all extraction longwalls work at the 1,000 ton level and none drop below the plan.

The unique linkage of tunnel driving brigades to specific extraction units plays a large role. Thus, the third "millionaire" section is supported by longwalls in A. Sakharov's brigade, while F. Kulik's tunnel drivers prepare work fronts for the second section, led by A. Potapov.

Not long ago F. Kulik's tunnel drivers were in very difficult mining geological conditions. Equipment was overloaded, mechanics and electricians could not keep up with repairs. Extractors came to give a hand. Later, A. Potapov's section got into such a mess that it could not get out of it without failing to meet the plan. A serious problem made it necessary to trim the longwall, as the miners say. Then their partners, the tunnel drivers, decided to cut their brigade in two. A. Potapov's section continued to work at the 500,000 ton level. It took coal from reserves which had essentially been written off. As a result, in spite of all the difficulties, both brigades met their targets. Miners in the second section even extracted 50,000 tons of coal above the plan.

The role of the brigade form of work organization is becoming more important. Sixty five such collectives have been set up at the mine. This year we plan to set them up at all sections.

The thrifty, rational use of material, energy and other resources is one of the most important sources of economies. Through this alone we intend to reduce production costs by 0.25 percent and obtain more than 100,000 rubles of profits. Three hundred cubic meters of timber, 400 tons of metal supports, 110 tons of

pipe, 140 tons of rail and a lot of other materials will be removed from old mine workings and used again. Here is a vivid example of our plans: in 2 months the savings were more than 260,000 rubles and above plan profit about 700,000 rubles.

Our engineers and party activists understand well that the trouble free operation of a giant such as the Vorgashorskaya Mine requires a mature management strategy and the ability to see far ahead. After all, special precision and forethought in every step are required to support 14 transitions to new longwalls without a hitch. This is attained through one of our main trump cards in the struggle for plans and obligations — the pace setting development of tunnel driving operations. I am solidly sure that our successes would be impossible without this. The current year's plan (and this has been accurately estimated) requires driving 26 kilometers of mine workings. We turned to the association with a request to increase it by 2 kilometers. On our own, having mobilized all reserves, we decided to drive an additional two. This is a guarantee against any eventualities.

I cannot imagine successful work without calling on engineering support for competition between collectives for the highest productivity and for savings. The tactic here is simple: we subject all so-called bottlenecks in the mine to constant critical analysis, thinking about where we are losing. This is simple where they are easily visible. This recently happened at the coal storage area. Frozen fuel wouldn't go down the return feed transporter because of an inaccurate calculation of its angle of inclination. We ourselves redesigned these components and did everything over. It later turned out that the winch for moving empty railcars was clearly not the type of mechanism needed. We started using quarry prime movers, putting them on remote control. Now the operator controls everything from a single panel. This has had results. While previously it took 10 - 12 minutes to load a car, we now handle it in 5.

Here are two more examples of such visible reserves. As you know, the Vorgashorskaya is a mine with continuous conveyor systems. As coal extraction increased it became clearer that an 800 mm wide belt could not provide for the required capacity and would hold up the longwalls. At the same time, scraper conveyors were also not bringing results, piles of metal had to be moved through the workings during installation and repair. While the machinery was still in use, our engineering service rebuilt all coal conveyors for 1,000 mm belts, and the tunnel drivers were given the old ones.

Other, not so clearly visible possibilities have been of considerable use. This required more thorough engineering studies, research and substantiation. We decided to increase the cross sections of sub-longwall openings from 8 to 10 square meters. Was this advantageous? This problem was disputed. As you know, while this speeds up the longwall's rate of advance and eliminates the manual excavation of niches, it complicates tunnel drivers' work. However, an experiment showed that it was advantageous. We place a major stake on the use of new, more highly productive equipment. For example, the 20KP cannot handle the entire thickness of the seam. The losses here are considerable. This year we will replace this obsolete machine with OKP-70's at three longwalls. This will yield an additional 45,000 tons of coal annually, reduce fuel production costs, improve labor productivity and result in a 96,000 ruble savings.

Creative engineering thinking has helped Vorgashorskaya miners at every step. For example, we decided to increase miners' useful work time by 0.2 percent this year. How could this be realistically achieved? It is helped by the automated system of time board accounting and control over production which we are introducing. At any time one can obtain from the display information on the work of a given longwall of advance of a face. One can just as accurately learn how much time a worker has spent in a mine and when he came to the surface.

Our experience shows that although they are more difficult to estimate, huge potentials lie in the strengthening of discipline, organization and order. We began this struggle with a decisive and public review of those guilty. No violator remains in the background, no matter which progressive collective he belongs to. Initially, "well wishers" even came to me stating that perhaps it was not worth it to bring the entire dispute out into the open. It is worth it, and how, even though it isn't easy for us to do it. The better brigades and sections assumed obligations of collective responsibility for each violation of labor discipline. Here is the procedure: even if there is just one violation, the entire brigade loses 25 percent of its bonuses and the violator loses all of it. If, in the course of a year, there were no violations, the collective receives an additional 40% of their bonus. The experiment is still under way, so no final judgements can be made. One thing can be definitely said: experience in applying the Law on Labor Collectives and in public review of violators have reduced their numbers by more than two fold last year.

The thorough search for and use of production reserves has had another major result. In answer to the party's call to thoroughly improve the economy's efficiency, communists at the Vorgashorskaya and the entire collective decided to increase coal extraction to six million tons. The practical significance of this is that the country will receive an additional 1.5 million tons of coal annually from the mine without any capital investments. Such are the results of the selfless labor by miners in the Polar Region.

I don't want to skip some of our problems arising from the intensive working out of coal reserves. After all, the miners are literally cutting off the branch on which they are sitting. In this regard, it seem right to me for USSR Minugleprom to make a special examination of the time frames for the design and construction of new horizons and shafts. We ourselves, of course, will not sit with are arms folded. Better management efficiency also requires that our counter plan be supported with material resources. In particular, miners are awaiting more powerful tunnel driving equipment. It would be good if railroaders on the Northern Railway, our partners in competition, would support the high pressure work of Vorgashorskaya miners with the rhythmic supply of railcars. All this requires that we even more thoroughly use available reserves, as demanded by the decisions of the CPSU Central Committee February Plenum.

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COAL

DEVICE TO CLEAN LONGWALL MACHINERY

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 19 May 84 p 1

[Article by L. Gurevich, mining engineer: "Manipulators Under Question"]

[Text] It is for good reason that modern coal longwalls are called iron, as they have much diverse equipment. All the same, the share of manual labor in the branch is great, exceeding 40 percent. At extraction faces it is mainly auxiliary work. One of the most laborious is the removal of chunks of coal and rock which fall out of the conveyor. An old "mechanism", the shovel, comes into play. If there is no clean up, the conveyor stops and the mechanized support sections cannot move ahead.

A. Belotserkovskiy, a senior scientific associate at DonNIPiavtomatgormash [Donetsk Scientific Research For Automated Mine Machinery] an inventor having many years of service, has proposed an attachment for this purpose, which can help put an end to the shovel in the longwall. What is it? Its best to have the inventor himself explain it:

"I am convinced that water can replace human hands here. It is used at longwalls to suppress dust. This mechanism is not at all sophisticated. Imagine a small cart less than a meter wide and long. It has a manipulator equipped with a hydromonitor and an impulse water sprayer, devices well known to miners. Above it is a small mobile television camera, the "eyes" of the device. A light is installed above it so that it can "see" better.

The operator's work site is in the drift. On the TV screen he sees everything there. Upon seeing a pile of coal dust building up, he moves a handle on his control panel to direct the hydromonitor to the spot. Hitting the pile, in a few seconds, the jet cleans it up. The water jet is also useful against pieces of rock. The apparatus sprays water in short, powerful and frequent impulses, pulverizing the rock. The hydromonitor then washes it away.

The cart is attached to the coal extracting combine. Moving along with the combine, it is always where coal accumulates. The question arises as to what about spraying here. Since all the equipment in a modern longwall can be remote controlled, from the drift, and there are no people at the wall this means there is no need for constant spraying. The water used for these purposes can be used to clean up coal piles. In essence, the longwall becomes a unique robot-complex.

Skeptics might object: Is this idea realistic? The answer to this question is in the conclusions of the authoritative state expert review commission on inventions. It recognized the claims of the inventor and A. Belotserkovskiy was awarded an inventor's certificate. There is now the small matter of transforming the idea into blueprints and metal then into an operating device, at first experimental and later, after tests in mine conditions, into a trial series.

This is not complicated. Any mine repair plant, or even a good machine shop at a large mine could easily built an experimental model. After all, a sizable share of the manipulator is built from series produced parts which are not in scarce supply. The inventor estimates that it would not cost more than 4,000 - 5,000 rubles.

Obviously, today nobody can predict how the manipulator will behave at a long-wall. However, it is necessary to test the invention as soon as possible so that what happened to the skids for moving people and freight along longwalls will not happen to it.

A proposal concerning such skids was published in the journal TEKHNKA --- MOLODEZHI in 1974, but nobody in the country was interested. Then, at the international exhibit "Coal-83" two West German firms, Westfalia-Lunen and Heimscheidt displayed quite similar devices. A coincidence? Hardly.

The matter now rests with the USSR Ministry of the Coal Industry, which needs a manipulator at every mine. Such a fruitful idea cannot but cause a lively response.

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COAL

BRIEFS

VORKUTA MINE REBOUNDS—Vorkuta—Since the start of the year miners at the Severnaya Mine, Vorkutaugol' Association have produced 1 million tons of fuel. In the current year they reached this mark considerably earlier than last year. The miners at the enterprise, which is famous in the Arctic Circle area and which had experienced difficult times, thus marked their return to the ranks of progressive units. In May alone they put more than 5,000 tons of fuel on above plan account. [By V. Krukovskiy] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 6 Jun 84 p 1] 11574

IMPROVED PRODUCTIVITY—Donetsk—Since the first of the year miners in Donetsk Oblast have hoisted up 1 million tons of above-plan coal. This result was attained a month and a half earlier than last year. The entire additional amount, equal to the annual capacity of a large mine, was attained through additional growth in labor productivity. The oblast's miners increased their output by more than two percent instead of the 1 percent promised. They have also met obligations for production cost reductions, saving the oblast's coal industry about 8 million rubles. The greatest contribution to the general successes was made by miners in the Donetskugol' Association who extracted 600,000 tons of above plan coal. [Excerpt] [Moscow TRUD in Russian 17 May 84 p 1] 11574

KUZBASS ACHIEVEMENTS—Workers in the Kuzbass coal industry passed a noted mark; since the start of the five-year plan they have extracted 500 million tons of coal. The tone in the socialist competition was set by collectives in the Kemerovougol' Production Association. Every year they fulfilled plan targets and socialist obligations. The Kedrovskiy Coal Pit is one of the best in the Association. Since the start of the year miners at the enterprise have put 35,000 tons of fuel on above plan account. Stripping operations have moved 360,000 cubic meters of rock in addition to the targets. The main economic indicators are surpassing the planned level. [Excerpt] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 2 Jun 84 p 1] 11574

AMUR LAGGING—Since the start of the year, miners in the city of Raychikhinsk, Amur Oblast (V. Zarubov is association general director) have failed to provide consumers with about 140,000 tons of fuel. The collectives at the Shirokiy and Yugo-Zapadnyy Pits are working unevenly and unstably and extraction is falling at the Raychikhinskiy and Severo-Vostochniy Pits. The difficult situation here is due to the deterioration of labor and technical discipline and emergency idle

times. For example, an operator was at fault for breaking a boom which caused one of the basin's largest excavators to sit idle for several weeks. Other breakdowns have also hurt the schedule. Heavy wear on equipment and the lack of spare parts for excavators and other machinery is also reducing productivity. The USSR Ministry of the Coal Industry could help in their supply. This especially applies to electrical equipment. When an electric motor breaks down, it is necessary to take it out of the pit and to the repair plant in Raychikhinsk instead of replacing the spare part. At the plant there is a several days wait for excavator motors. Productivity is lost because of incomplete crews and high cadre turnover. There are not enough workers in the basic professions here. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 18 May 84 p 2] 11574

INTA PREPARATION PLANT—Inta—The collective at the Kapital'naya Group Preparation Plant, Intaugol' Association has processed 100,000 tons of coal above the plan. The successes result from shift competition for maximum labor productivity. It is quite high here — 700 tons per worker per month. It was planned to reach this level in 1985. The shift led by S. Galkin is the best. [By V. Krukovskiy] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 29 May 84 p 1] 11574

DEEP MINE—KARAGANDA—The deepest vertical shaft in Kazakhstan has been sunk at the Zholymbet Iron Mine. Reaching the 1,000 meter mark yesterday, the collective of the Karagandashakhtoprokhodka [Karaganda Mine Shaft Sinking] Administration completed its work ahead of schedule. An original method for isolating water bearing strata improved the productivity of drilling equipment. It eliminated the accumulation of water at the shaft bottom, which halted equipment. The innovation eliminated rock drilling equipment idle time which, even though permitted by norms, is unproductive. It also increased its speed in these difficult geological conditions. This simultaneously eliminated the laborious installation of down hole pumps and piping. This new method of isolating water bearing strata is of increasing importance due to the development of deep mineral deposits in central Kazakhstan. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 18 May 84 p 1] 11574

MINERS CONFERENCE—Karaganda—Problems in the exploitation of thick coal seams were at the center of attention of an All-Union Scientific and Technical Conference conducted here. It discussed problems in the development and introduction of progressive technology, the mechanization and automation of main and auxiliary processes for fuel extraction and other questions. Recommendations were made. [Text] [Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 29 May 84 p 2] 11574

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END

NUCLEAR POWER

DESIGN, WORK FORCE MANAGEMENT PROBLEMS AT BALAKOVO AES

Moscow SOVETSKAYA ROSSIYA in Russian 20 Apr 84 p 2

[Article by Yu. Burov, staff correspondent: "Unplanned Turns"; passages rendered in all capital letters printed in boldface in the original source]

[Text] The special correspondent at the Balakovo AES reports: plant construction workers are successfully carrying out their socialist obligations. However, there are problems, the resolution of which depends on the Ministry of Power and Electrification.

At the beginning of this year our newspaper told about commitments which were made by the Saratovgesstroy Administration. Three months have passed. How is the fulfillment of the commitment going? Construction workers at the Balakovo Atomic Power Plant have fulfilled the plan, having substantially raised their labor productivity in comparison with that of last year, as well as the volume of their output. Installers, concrete workers, transport workers, electricians and trouble shooters have worked well.

Brigade leader N. Bokov's face is flushed from stress; he looks gloomy. Nikolai Ivanovich who is usually a reserved person on this occasion cannot hide his bad mood.

"I am a concrete worker," he reminds us, showing some temper, "but I have to work more with a pneumatic drill than a vibrator! How much labor, time and material is lost because of alterations!..."

The construction worker's words are justifiable. Often, too often, workers have to destroy with their own hands that which has already been accepted by construction committee. Pneumatic drills and sledge hammers have become everyday tools in the majority of the concrete workers', installers' and even electricians' brigades. Even engineers are trying to help them master the "new" technology. They design tools themselves as well as seek throughout the whole country the most effective devices for breaking openings in steel reinforced concrete walls almost a meter thick. "Emergency" holes with diameters from 100 mm to more than a meter, already number more than 15,000 at the power plant, and their number is growing rapidly. What's wrong here? These mass alterations are caused by a stream of changes which the designers introduce into their own plans.

Here is only one example of many. Over a period of 2.5 months since the beginning of the year about 700 sets of plans, half with changes and more than 300 with amendments, have been received by Promstroy Administration. In fact, according to current rules all the design documentation should have been given over to the construction organization last summer. If it had, it would have been possible to analyze in advance needs for designs, materials, work force and machinery. Now it's necessary to decide everything on the run and in a hurry. The quality of the plans cannot withstand criticism; they contain minor and major errors, miscalculations; some plans are so sloppily done that they can't even be read.

The underfulfillment of assigned work at projects is not a new thing for atomic power plant construction workers and installers. Many critical signals were sent to industry headquarters from here. In response there appeared orders and directives like "show the way," "activate," "obligate." However, they have not changed the situation. Plans for the Balakovo workers have been prepared not only by the Urals Branch of the Atomteploelectoproekt Institute, but also by Gor'ki, Moscow and Kharkov engineers. Their work style has not been characterized by conscientiousness or certainty. Minister P. Neporozhniy who was recently at the site on one of his customary visits demanded that L. Voronin, the chief of the Main Scientific Research and Design Institute (GlavNIIProekta), take decisive measures to ensure that construction workers received quality plans in a timely manner. The deadline has passed. What has changed?

"Designers recalled cable installations plans," commented chief engineer of the Balakovo AES T. Plokhii. "Reference was made to shortcomings that had been uncovered. This exactingness on their part would have been laudable if there hadn't been a start-up deadline. They have many other 'debts' to pay which slows down the operation."

A conference of representatives took place in Moscow which analyzed the state of affairs at Balakovo. The ministry directors present gave assurance that the power plant would receive all the equipment on time. HOWEVER, NOW INFORMATION "CORRECTED" AFTER THE AFOREMENTIONED CONFERENCE IS COMING TO BALAKOVO FROM THE MINISTRY OF POWER MACHINE BUILDING, MINISTRY OF CHEMICAL AND PETROLEUM BUILDING, AND THE MINISTRY OF INSTRUMENT MAKING, AUTOMATION EQUIPMENT & CONTROL SYSTEMS. THE MESSAGE IS THE SAME: THE EQUIPMENT AND APPARATUS WILL BE SENT LATER THAN PROMISED.

A labor shortage at the site is noticeably slowing down the pace of work at the site. For more than a year there has been correspondence back and forth between the ministry and the management of the construction project, the Balakovo City Party Committee, and the Saratov Oblast Party Committee about the necessity of strengthening the power plant's complement of installation workers with additional teams of skilled workers. Industry headquarters on more than one occasion promised to do just that. However, the promises have remained just promises. In summary: due to the fault of the installation workers the erection schedule of the main power plant component, the reactor section, was disrupted. When these hydro-installation workers straightened themselves out, the efforts of the electrical and power installation workers and of the power plant chemical safety specialists broke down. In order to shake off the chain reaction of delay, the minister committed the directors of union organizations for power plant installation, for electrical installation and for power plant safety

(Soyuzenergomontazh, Soyuzelektromontazh, Soyuzenergozashchita) and of the Gidromontazh Trust in March to sharply increase the number of work teams at the reactor section by sending such teams to Balakovo from other construction sites. In addition, managers of these main administrations were obliged to remain at Balakovo to coordinate these efforts. April is ending but the order has been carried out only by the general contractor--the Saratovgesstroy Administration.

With the advent of spring it is necessary to increase the volume of all operations at the site and in the shops of the power station. This has been clearly spelled out in the decisions made by the Ministry of Power and Electrification. It is now time to more quickly transform words into deeds.

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CSO: 1822/278

NUCLEAR POWER

GIANT CRANE TO SPEED CONSTRUCTION AT BALAKOVO AES

Moscow SOVETSKAYA ROSSIYA in Russian 9 May 84 p 1

[Article by Yu. Burov, staff correspondent: "Giant Operations"]

[Text] Crane operator Gennadiy Frolov has the most conspicuous work station at the construction site: the cabin of his crane is 80 meters high. From there on a nice day all the power station buildings, roads, greening fields, a reservoir and the curved bank of the Volga spread out before him. However, crane operators like Frolov have little time to admire all of this. The crane that Frolov and his fellow workers operate is still the only one of its kind in the country and its still "learning" its job. There is enough work for all three shifts. Despite the "youth" of this giant lifting mechanism, it has, nevertheless, many truly unique operational capabilities. There follow two lines from the "biography" of the crane.

These entries were noted in the shift log book: "4/9/1984, hoisting of the reactor stack into place, 250 tons." "4/18/84, delivery of a steam generator to the reactor section, 320 tons." Behind these laconic notations there exists a fundamentally new technology for the construction of atomic power plants. This technology ensures the dramatic reduction of time needed for construction, and also for equipment installation; the quality of all operations will improve noticeably with an accompanying reduction of expenditures on labor. It's easy to become convinced of this, even without any special calculations.

Take that reactor stack, for example. In the past at all the country's power plants such a stack was raised in sections. For its assembly and installation special devices were needed as were protective measures that guaranteed the safety of the operation. However, at Balakovo V. Krapivki's assembly team prepared this unit on the ground under conditions far more convenient. As a result, shifts have become far more productive. It was easier to ensure, in addition, the super-strength of all the "seams" of the stack, under which the "heart" of the atomic power plant, the nuclear reactor, will labor for many years.

Power plant construction workers in full measure have felt the advantages of this powerful crane: "the "giant" has changed the way in which they organize their work. For example, when undertaking the enlargement of some units, the teams of N. Kravnov and A. Volyns joined forces. The combined team has better

maneuverability and the ability to concentrate necessary forces at the decisive moment of an operation. A month of the joint operation has confirmed this. Three steam generators have been assembled and installed at an accelerated pace; a unit weighing 350 tons awaits their attention.

"Such heavy equipment is not so common," operations director Yu. Goryashchenko explains, "but without the crane for its assembly, very much time used to be spent on its installation. Working with large units speeds up operations; this includes pipeline laying. It has been made possible to transfer a substantial portion of these operations to plants and factories."

The experienced manager, who has to his credit many important construction projects, with good reason stressed this situation. The pipes about which he spoke are especially durable two ply pipes that are joined by means of a special welding process and whose joints are subjected to numerous checks for strength. Of course, all of these operations are much more easily done under the roof of a shop.

And then there is still another meeting in the assembly area next to the reactor section. At the present moment the installation teams of N. Avramenko and R. Abdrakhimov are busy here with an unusual job: they are assembling the sixth and seventh tiers of the airtight zone of the first power unit. Each of them is a ring with a diameter of about 50 meters and an approximate height of a two-story house. This "little ring" consists of 12 lobes. Formerly, they were welded to one another high above the assembly area--it was time consuming and troublesome to "sew" the metal shell of the station. With the introduction of the crane it was decided to work with large units. However, the tier assembled by Abdrakhimov's team weighed more than 900 tons. This weight was beyond the capacity of even the giant crane. How could it be done?

"We assembled the tier," said the team leader, "by raising to the appropriate height and installing the 'ring' in parts, by quarters. 'Big Ivan,' as the giant crane was christened at the site, could cope with them easily."

But why in the article is most of the talk about installers? The fact is that the powerful crane saves time and labor more often in these kinds of operations. It is not yet a good helper to the construction workers.

"As soon as 'Ivan' starts to work," explained the noted construction team leader N. Derkach, "all the tower cranes stop. Naturally, we have a needed smoke break..."

"A justified criticism," agreed A. Kulagin, a representative of the Orgenergostroy Institute "many of us have not taken the organization of labor into consideration in our design plans. While relying on practice we will correct the flaws."

There lies before the builders of atomic power plants the following step: to master large unit installation of structures and simultaneously to conduct operations utilizing all construction site personnel. An especially complex stage of

the operation at the site is the thirteenth power unit component. In the past when raising it--formerly, there was no powerful crane, and experience was lacking--units could not be combined, but on the contrary some of large size and heavy equipment had to be separated into sections for installation. However, the new technology now guarantees victory within a few months at the second power producing unit of the plant. The engineers consider this so; the work team chiefs are convinced of it.

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CSO: 1822/278

PIPELINE CONSTRUCTION

RIGA-DAUGAVPILS GAS PIPELINE TO BE BUILT IN 1984-1985

Riga SOVETSKAYA LATVIA in Russian 16 Mar 84 p 3

[Article: "Pipeline Construction"]

[Text] The Latvian SSR Council of Ministers adopted a resolution on measures to ensure construction of the Riga-Daugavpils gas main in the 1984-85 time frame at a high organizational-technical level. It provided a directive to ministries and departments of the Latvian SSR, rayon and city executive committees (cities subordinate to the republic) of the Councils of Peoples Deputies (associated with construction of the Riga-Daugavpils line), republic-level associations and enterprises, including those that will be involved in construction of the pipeline, to consider construction of the pipeline one of the most important tasks in the development of the Latvian SSR fuel-energy complex and to give cooperation and assistance to the customer--Zapadtransgaz Production Association of the Ministry of the Gas Industry--and the contractor--Lengazspetsstroy Turst of the Ministry of Construction of Petroleum and Gas Industry Enterprises--in solving issues related to construction of the pipeline.

In accordance with this, specific tasks were given to the executive committees of the Daugavpilskiy, Ekabpilskiy, Ogrskiy, Preyl'skiy, Riga and Stuchinskiy rayon Councils of Peoples Deputies, the Ministry of Forestry and the Timber Industry, Ministry of Construction, Ministry of Communications, Ministry of Land Reclamation and Water Resources, Ministry of Motor Transport and Highways of the Latvian SSR, and a number of other ministries and departments. These tasks concern felling non-essential forest tracts at branching sites, construction of plank roads in the swampy sections of the route, building a gas distribution facility in the city of Daugavpils, installing and outfitting transportable work camps, providing material and technical supplies to the construction sites and solving accommodation and housing problems.

In its resolution, the Council of Ministers pointed out the inadequate work of the Ministry of Light Industry, Ministry of the Construction Materials Industry, Ministry of Consumer Services, Livanskiy Pilot Biochemical Plant, Daugavpils Khimvolokno [Chemical fiber] Production

Association, and the Latvian SSR State Committee for Gasification, associated with preparing the plants under its jurisdiction, as well as enterprises and organizations to obtain natural gas from the Riga-Daugavpils main line, and construction of city gas pipelines. The Council of Ministers made it incumbent on the supervisors in those ministries, departments, and enterprises mentioned above to take urgent measures for the timely preparation to receive the natural gas.

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CSO: 1822/322

GENERAL

GOALS OF USSR ENERGY PROGRAM

Moscow ENERGETIK in Russian No 6, Jun 84 pp 1-2

[Article of the USSR Energy Program: "The Resolutions of the 26th CPSU Congress—Realize Them!"]

[Text] Fundamental Tenets of the USSR Energy Program Over the Long Term

The Fundamental Tenets of the USSR Energy Program stipulate:

—a continued active energy conservation policy on the basis of accelerated scientific and technical progress in all sections of the national economy, and in daily life all possible savings of fuel and energy, guaranteeing on this basis a significant reduction of the specific power consumption of the national income;

—the acceleration of technical progress in the branches of the fuel-power complex and also in machine building and other adjacent branches of industry that supply equipment, machines, and materials to this complex;

—a guarantee of accelerated rates of growth of the production of electrical energy in comparison with the growth rates of output and production of primary power resources;

—the acceleration of the development of the gas industry to satisfy the domestic requirements of the country and export needs;

—a guarantee of a steadily high rate of petroleum production, including that obtained from increased oil bed discovery;

—early preparation of industrial fuel supplies, especially oil, and a sharp increase in the volume and effectiveness of deep exploratory drilling for oil, first of all in the regions of most potential;

—ensuring the growth of motor fuel resources, owing first of all to increased volume and extent of refinement of petroleum with a simultaneous substantial reduction in the expenditure of residual oil by electrical power plants, and also by means of the wide use of compressed and liquefied natural gas as a motor fuel and the organization, in accordance with the solutions of

scientific and technical problems, of the production of synthetic motor fuels from gas, coal, and oil shale;

—the intensified development of nuclear power for the production of electrical and thermal energy and the liberating on this basis of a significant amount of organic fuel, and the construction of pumped storage electrical power plants with switching capability in the European part of the country;

—the development of the coal industry, primarily by increasing coal output using strip mining in eastern regions, and the construction of powerful thermal power plants using this coal;

—economically justified complex assimilation of the hydraulic power resources of Siberia, the Far East, and Central Asia;

—the establishment of a technical and material base for the use of fast reactors, secondary nuclear fuel, thorium and its compounds, the energy of thermonuclear fusion, and also non-traditional renewable sources of energy, including solar, geothermal, tidal, and wind energy, and biomass;

—the optimal combination of various methods to transport a large quantity of power resources to the European part of the country from eastern regions, mainly from Siberia, where the primary growth in the production of organic fuels will be secured;

—an increase in the reliability of fuel and energy supply by means of establishing the necessary production capabilities in the branches of the fuel-power complex;

—ensuring, in the necessary quantities, the export of fuel and electrical energy, in the first place for the joint solution of power problems with fraternal socialist countries, and also for effective participation in the international division of labor.

The realization of the USSR Energy Program will entail:

—an increase in the total volume of economic outlay share of material and financial resources directed for the fuel-power complex and the branches of industry that supply this complex with equipment, machines, and materials;

—the further improvement in geographical distribution of the production forces of the country in the trend to bring them closer to the primary fuel-power bases of the USSR;

—improvement in management and raising the level of supervision of production in the branches of the complex.

The implementation of the USSR Energy Program is planned for two stages. The first stage will be completed around the beginning of the 90's. In this stage the problems of reliable energy supply for the national economy of the

USSR will be solved by maintaining the high levels of petroleum production, rapid increases in the volume of production and transport of Siberian gas to the European part of the country, and accelerated development of nuclear power. In this period the necessary prerequisites will be established for the intensive growth in coal production in subsequent following years, and also conditions will be prepared for a general switchover of the economy to an energy-conserving mode of development.

In the second stage, that will be completed at the turn of the century, the energy effectiveness of social production will rise at rapid rates due to intensive energy conservation and speeding up scientific and technical progress. In the middle of this stage gas production will reach the maximum level assigned by the program and will be stabilized, and the further growth of power resources will be ensured mainly by the production of nuclear energy, the production of coal by the open method, and also by the use of renewable energy sources.

The Soviet Union will direct its efforts toward the development of cooperation with CEMA member-countries in the area of power engineering along the following basic trends:

- carrying out a series of measures on the economical and rational use of energy sources; lowering the energy consumption of social production, in part by means of raising the technical level of all aspects of energy consuming equipment on the basis of international cooperation;

- a change in the structure of the production of power resources, directed first of all at more complete satisfaction of the energy requirements of each of the CEMA member-countries by accelerated development of atomic power; wider use of the domestic solid fuel resources, including low-calorie coal, and also drawing new sources of energy into the power balance and organizing the production of synthetic liquid fuel from coal and shale;

- strengthening work on the implementation of the Long-Term Goal-Oriented Cooperation Program approved earlier, in order to secure the economically valid requirements of CEMA member-countries for the basic types of energy, fuel, and raw materials in the period up to 1990; in addition, an energy conserving policy must be implemented, and additional measures for increasing cooperation in this area must be drawn up.

The Soviet Union will continue to carry out efforts for the development of mutually beneficial economic, scientific and continued technical cooperation with industrially developed capitalist countries, especially with the countries of Western Europe and Japan in the solution of energy problems, which corresponds in full to the Peace Program for the 80's that was put forward at the 26th CPSU Congress.

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CSO: 1822/343

GENERAL

CEMA NATIONS ENERGY RESOURCES: PRODUCTION, CONSUMPTION BY INDUSTRY

Moscow EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV in Russian No 3,
Mar 84 pp 71-74

[Article by Zdenek Rakhach, CEMA Secretariat: "Energy Producing Fuel Resources: Their Production and Consumption"]

[Text] Rates of Production

The majority of the CEMA countries satisfy a substantial part of their demand for basic types of fuel and energy by means of their own production and reciprocal deliveries. In 1982 the production of energy resources as a whole in CEMA countries increased in comparison with 1980 by 3.8 percent and reached 2,481,000,000 tons (in terms of standard fuel).

As a result of the cooperation of the fraternal countries in maintaining stable growth in fuel and energy production, their share of world production of them increased. In 1975 it was 25 percent, but at the beginning of the '80's it was almost 27 percent. CEMA members' share of world production of solid fuels is declining, while their share of liquid and gas fuels is consistently rising.

Today the total consumption of energy resources in the CEMA countries is more than 2.2 billion tons of standard fuel. This is more than 70 percent more than in the EEC countries (European Economic Community). From year to year energy resource utilization efficiency has been growing; the dynamics of energy resource consumption are growing somewhat slower than the dynamics of production. However, the fraternal countries' share in world consumption of energy resources is increasing and has reached about 25 percent (table 1)

Table 1

**The Share of CEMA Countries in World Production
and Consumption of Energy Resources**

| in % | | | | |
|----------------|-------|-----------|--------|-------|
| | | Including | | |
| | Total | Solid | Liquid | Gas |
| Production | | | | |
| World | 100.0 | 100.0 | 100.0 | 100.0 |
| CEMA Countries | 26.6 | 34.4 | 20.0 | 31.2 |
| EEC Countries | 6.7 | 9.8 | 3.0 | 10.1 |
| Consumption | | | | |
| World | 100.0 | 100.0 | 100.0 | 100.0 |
| CEMA Countries | 24.9 | 33.1 | 17.5 | 29.8 |
| EEC Countries | 14.5 | 12.1 | 16.6 | 13.9 |

The production structure of the primary energy resources is changing: the relative significance of gas is growing; solid fuel's share is declining; liquid fuel's is remaining stable.

The relative significance of CEMA countries in world consumption of liquid energy resources is increasing, while in the consumption of solid fuels it is falling. In the CEMA countries' consumption of primary energy resources, solid fuels occupy first place. However, as in production, a downward trend is noticeable here. The relative importance of gas is growing. Liquid energy resources' share is remaining stable. In developed capitalist countries, especially in EEC countries, another picture has developed in recent years: consumption of solid fuels has been increasing, while consumption of liquid fuels has been declining (table 2).

The production of electric power in CEMA countries has been developing at rapid rates. Taken as a whole in 1982 it was 1,811 billion kilowatt-hours, which is almost 1.5 times the production of the EEC countries. In addition, visible consumption¹ of electric power in CEMA countries' economies has been increasing significantly.

Its growth rate as a whole for the years 1981-1982 was 4.7 percent. In several CEMA countries electric power consumption has been growing faster than its production. This is characteristic most of all for Hungary, Vietnam and Mongolia.

Table 2

A Breakdown of Primary Energy Resources

| in % | | | | |
|----------------|-------|-----------|--------|-----|
| | Total | Including | | |
| | | Solid | Liquid | Gas |
| Production | | | | |
| World | 100 | 29 | 48 | 20 |
| CEMA Countries | 100 | 38 | 37 | 24 |
| EEC Countries | 100 | 42 | 21 | 31 |
| Consumption | | | | |
| World | 100 | 31 | 43 | 22 |
| CEMA Countries | 100 | 42 | 30 | 26 |
| EEC Countries | 100 | 26 | 50 | 21 |

In 1982 coal production (in terms of standard fuel) in CEMA countries as a whole was almost 838 million tons, 22 million tons, or 2.7 percent, more than in 1980.

In 1982, 627 million tons of petroleum were produced, 10 million tons or 1.6 percent more than in 1980, as well as 522 billion cubic meters of natural and manufactured gas, 13.4 percent more than in 1980. This growth has been provided mainly by increasing production in distant and remote regions of the USSR.

The share of petroleum and natural and manufactured gas in the output of power resources (in terms of standard fuel) in the CEMA countries rose from 60.9 percent in 1980 to 62.5 percent in 1982 (the world figure is 68 percent), and the share of coal fell from 34.1 percent to 33.7 percent (the world figure is 29 percent).

In connection with the growth of electric power consumption, the consumption of the main heat-carriers has risen. The consumption of coal (visible) rose in 1981-1982 in CEMA countries as a whole by 1.7 percent.

From 1971 through 1980, mainly as a result of imports from the USSR, the growth of petroleum consumption in the CEMA countries was maintained overall; it grew by a factor of 1.7 and the consumption of natural and manufactured gas doubled. The growth rates in petroleum consumption in the economies of particular countries (primarily Bulgaria, GDR, Poland and Czechoslovakia) over the past decade was about 4-7 percent a year, and the rates for gas rose by a factor of 2 to 10. This is primarily associated with providing for the needs of the transport industry, chemical production, agriculture and everyday municipal services. This is why the production of diesel fuel, heating oil and gasoline doubled.

At the beginning of the '80's petroleum consumption in the economies of most of the CEMA countries fell, but in 1982, overall, it remained at the 1980 level, while natural and manufactured gas consumption grew by almost 12 percent compared with 1980.

Industry is the largest consumer of fuel and electric power. In 1982 its share of all electric power consumed in the country was 50 percent in Bulgaria, 61 percent in Hungary, 62 percent in the GDR, 58 percent in Poland, 64 percent in the SRR, 60 percent in the USSR, and 68 percent in Czechoslovakia. The consumption of fuel and electric power was especially high in the fuel, metallurgical, chemical and building materials industries and in other energy-intensive production.

Consumption Trends

Given the huge rates of fuel and electric power resource production and their growing role in the economy, the question of their economical and efficient use takes on a special urgency. This question is being resolved by improvement of manufacturing methods; more efficient consumption of fuel, electric power, raw materials and other materials in the production of energy intensive and material intensive forms of industrial production; and improvement in the organization of production and consumption including the utilization of the advantages of socialist economic integration, etc.

In addition, data have been produced about the results of efforts to economize energy in several areas of industry in the CEMA countries.

Electric power production and the fuel industry. All CEMA countries are giving special attention to raising the efficiency of fuel use in the production of electric power, especially at TES's (thermal electric power stations). Table 3 provides information about achievements in this area.

Table 3

Relative Expenditure of Standard Fuel per
Kilowatt-hour of Electric Power Produced
at General Use TES's (in grams)

| <u>Country</u> | <u>1970</u> | <u>1980</u> | <u>1982</u> |
|----------------|-------------|-------------|-------------|
| Bulgaria | 458 | 447 | 438 |
| Hungary | 452 | 394 | 394 |
| Cuba | ... | 434 | 423 |
| Mongolia | 570 | 416 | 419 |
| Poland | 424 | 390 | 386 |
| Czechoslovakia | 462 | 422 | 425 |

The relative expenditure of standard fuel per kilowatt-hour of electric power produced at TES's declined overall from about 392g in 1970 to 348g in 1982. Given overall production of more than 1,500 billion kilowatt-hours of electric power, this comprises a relative economy of about 60 million tons of standard

fuel; this includes a reduction of per unit consumption in the USSR of 40 g which provides a relative economy of about 45 million tons of standard fuel.

Now, in connection with changes in conditions under which coal, petroleum and gas are produced in the CEMA countries as a whole, the relative consumption of energy on retrieval of these energy resources is growing. At the same time several CEMA countries have established the opposite tendency.

For example, the USSR in 1982 achieved a reduction in per unit consumption of fuel and heat energy in the production and processing of petroleum. This was a result of improving the utilization of heat energy, improving the structure of manufacturing equipment, adopting new catalysts in the hydrorefining process and the catalytic reforming process and introducing modern high-tonnage and combined manufacturing. The reconstruction and modernization of operating installations also contributed to the reduction of energy consumption and permitted the saving of a huge amount of fuel. In particular, the reduction of the per unit consumption of fuel in the processing of petroleum made it possible in 1982 to save 930,000 tons of standard fuel.

In Bulgaria the reduction of per unit consumption of electric power in the open-pit production of one ton of brown coal permitted in 1982 the saving of 3 million kilowatt-hours on the basis of approved consumption standards and in the processing of petroleum, 2.9 million kilowatt-hours and 11,000 tons of standard fuel. In Poland the per unit saving of fuel in the production of bituminous coal was 379 million kilowatt-hours and 13,000 tons of standard fuel in 1982.

In the CEMA countries' fuel and oil refining industries there is still much room for further efficiency in fuel and energy consumption. Various indicators of per unit consumption by country in the production and processing of coal and petroleum indicate that by utilizing progressive methods reductions in fuel and electric power consumption can be achieved in these industries.

Ferrous metallurgy. In this industry growth of the relative consumption of fuel and energy per ton of metal product and a substantial rise in the volume of energy consumed overall have been observed. Thus, in Poland in 1982 a relative overconsumption of 145,000 tons of standard fuel was tolerated in the production of open hearth steel, and in Bulgaria, of 6 million kilowatt-hours of electric power in the production of electric furnace steel, etc. There are analogous examples in a number of other CEMA countries. In part this has been caused by the increase in energy expenditures in connection with raising the degree of raw material preparation and enrichment, mastering new technologies of continuous casting, more widely adopting powder metallurgy, implementing environmental protection measures, and other factors.

The improved efficiency of fuel and energy resource utilization in ferrous metallurgy is connected with the development and introduction of new, less energy-intensive technologies and separate metallurgical units. Thus, in Poland the reduction of per unit electric power consumption for the production of one ton of electric furnace steel by only 3 percent made possible a saving of almost 56 million kilowatt-hours. Also, the reduction of per unit fuel consumption by 1.8 percent in the production of cast iron yielded a savings of 98,000 tons of standard fuel.

Non-ferrous metallurgy. Here good results have been achieved in reducing the level of energy expenditures. Thus, in Bulgaria in 1982 the relative consumption of fuel for the production of electrolytic copper fell by 8 percent compared with last year, and that saved almost 1,000 tons of standard fuel and 2,686,000 kilowatt-hours of electric power. The relative consumption of fuel in the production of electrolytic zinc fell by 16 percent and yielded savings of 1,900 tons of standard fuel and 2.7 million kilowatt-hours of electric power.

The chemical industry. In this industry, mainly by adopting secondary energy resources, a substantial relative economy of electric power was achieved. For example, in the USSR in the production of synthetic ammonia the savings were 1.9 billion kilowatt-hours; in Bulgaria, 22.5 million kilowatt-hours and in Poland in the manufacture of calcium carbide, 11 million kilowatt-hours, etc. At the same time, in the chemical industry in the manufacture of a number of products, growth of relative consumption of fuel and electric power has been observed and simultaneously the relative overexpenditure of energy in comparison with 1980, basing calculations on the total volume of production.

The building materials industry shows a drop in the relative consumption of fuel. For example, in the USSR in the production of cement clinkers and construction bricks, 171,000 tons of standard fuel was saved in comparison with 1980. In Bulgaria a relative saving of 20,000 tons of standard fuel was achieved in the production of cement; there was a reduction of the relative consumption of electric energy in the production of one ton of cement of two kilowatt-hours which gave a relative saving of 10 million kilowatt-hours.

Introduction of progressive technologies to a substantial degree contributed to the rise in efficiency of fuel and energy utilization. In particular, the production of cement clinkers by the dry method permitted a reduction of the relative consumption of fuel by about 50 percent in comparison with the wet method.

In the woodworking and paper and pulp industry there exist broad opportunities to save energy, especially by utilizing production waste. The study and spread of the progressive methods of the fraternal countries in this area would help eliminate existing discrepancies among indicators of relative consumption of fuel and electric power in the production of certain types of products.

In the USSR in 1982 the improvement of manufacturing methods, the improved efficiency in utilizing its own secondary energy resources, the modernization of the existing inventory of basic power engineering equipment and other factors ensured the reduction of relative consumption of electric power in the production of pulp and saved 45 million kilowatt-hours of electric power.

In the processed food industry of the CEMA countries the production of sugar, liquor and beer is the most energy intensive. The level of energy consumption in the production of these types of products depends on the type and quality of the raw material being processed (for example, whether sugar beet or cane sugar is used in producing raw sugar) or on the type of manufacturing process. Therefore, special attention is devoted to improving energy-consuming installations when raising the capacity of manufacturing units and to utilizing supplementary energy resources, etc.

Thus, thanks to the industrial efficiency of the manufacturing equipment, 1.8 million kilowatt-hours of electric power were saved in Poland in 1982 in the production of raw sugar. Lowering relative consumption of electric power by 12 kilowatt-hours in the production of one hectoliter of beer permitted savings in Bulgaria of 6.8 million kilowatt-hours in comparison with 1981.

On a Joint Basis

The urgency of the problems in CEMA countries of saving fuel and energy resources in industry and the need to solve them call for the development of appropriate, integrated measures. One of the main tasks is the establishment of progressive standards for the consumption of the most important types of fuel, energy, raw material and materials used during the manufacture of products. The method prepared within CEMA for determining and calculating indicators of per unit consumption of fuel and energy in industry according to 65 types of products and corresponding manufacturing methods has great significance.

Work is continuing in this direction. In particular, standards have been determined for the production of goods in seven sectors of the CEMA countries' industry on the basis of the unification of the indicators of relative consumption of the primary types of raw materials and other materials. This promotes the analysis of standards implementation and contributes to information about the efficient use of raw material resources in individual countries of the CEMA group.

As was noted at the 35th and 36th CEMA session meetings, the problems of economy and efficient use of all types of energy resources can be fundamentally solved only by systematic restructuring of industrial production, preferential development of less energy intensive production and development and introduction of resource-saving procedures and technology.

Footnotes

1. The total of domestic production and imports less exports of that type of production (for petroleum, gas, and coal without regard for changes in state reserves and product remaining with the supplier or the consumer).

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